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ART. I.—*An Essay on Tenotomy, with illustrative Cases.* By S. B. RICHARDSON, M. D., Lecturer on Anatomy and Surgery, &c., of Louisville, Ky.

THE operation of Tenotomy in the treatment of club-foot, which has met with such encouraging success recently in the hands of Stromeyer, of Hanover, and Bouvier and Duval, of Paris, (professed orthopedists of the continent of Europe) must be regarded by all who are familiar with the subject as a beautiful illustration of established physiological and pathological principles, and an undoubted advancement in the

treatment of a very extensive but hitherto neglected class of individuals, found in every community.

In the *legitimate* employment of the term, it may be stated in the outset, that *tenotomy* must be regarded as a *discovery*, of such extensive application and importance, as to take rank with those great and acknowledged improvements in medical and surgical science, which have shed such brilliant lustre upon all that appertains to medicine, during the present age.

Like most true discoveries the merit of its origination cannot be awarded to the labors of a single individual, but it will be found upon a careful inquiry into its history, that the facts which led to its deduction were made known *long* anterior to *designed* tendinous section itself.

How encouraging should a fact like this be to those who are laboring in the field of observation, and thus become the benefactors of science, it is needless to insist. It rarely, in fact, falls to the lot of any *one* observer however qualified, to develope a single new principle in any department of knowledge. We are free to assert that every Newton will be found to have had a Gallileo, a Kepler, and other *observers* as his predecessors, and the remark will be found to apply not less appropriately to *medicine* than to *astronomy* and natural philosophy. Science, too, must be regarded, in some sense, as a *unit*, although artificially divided and sub-divided for convenience of study. It is not in the *nature* of true knowledge, but in the limited capacity of the human mind, connected with the comparatively *brief* period allowed for observation, that these artificial arrangements (in too many examples, dismemberments,) have been made and must be allowed to continue. What the God of nature has intimately associated should not in any case, cannot be dissevered except with the most injurious effects. Extra-professional scep-

ticism among the learned as well as the uninformed is known to exist to some extent every where, in reference to the verity of medicine as *a science*—with how much truth, let those, who are immediately interested, give the answer, and abate the odium if found in any degree to exist. Some medical men, too, at no very remote date, and who have received the exalted appellation of *medical philosophers*, are known to have regarded the term *science* applied to medicine, as an unallowable assumption.

By these remarks, we do not wish to be understood as embracing or countenancing the sentiment just referred to; on the contrary we have too much attachment for, and confidence in practical medicine to detract one iota from her just merits, and the noble stand which she has recently assumed, and is destined to occupy (if rightly studied) as an *exact* science. It must in candor, however, be admitted, that medicine has not kept pace with those sciences par excellence entitled *exact.* This is doubtless referrable to more causes than one—chiefly however to the neglect of the inductive or Baconian (may it not be entitled Hippocratic?) method of investigation, and the *multiplicity* of phenomena presented in *vital* manifestations, coupled with the heretofore almost inextinguishable thirst for theorizing, and *system building*, in medicine. The perception of this has led many distinguished physicians of the present age on the continent of Europe and elsewhere, to abandon the false route into which so many have strayed and wasted their energies, and to return to the path of patient observation,—admitting that there is not as yet a sufficient number of well established facts to serve as a basis for a theory, or, more properly, to evolve one or more controlling principles that are to organic what gravitation is to inorganic matter.

Without any farther preliminary remarks, we proceed to the subject which claims our immediate consideration.

When in the progress of pathological investigations it was ascertained, that *club-foot* essentially depends, on a *permanently shortened* or *contracted* state of certain muscles and tendons, connected with the movement of the foot upon the leg, and in some instances the toes upon the foot, the failure of every description of machinery to remedy it was easily accounted for. It was not less palpable, from what is observed in accidental rupture of the tendo achilles, as well as from direct experiment upon inferior animals, that nearly all obstacles to the *extreme* flexion of the foot upon the leg is overcome by a *section* of the tendons of the *extensor* muscles.

I have in my private cabinet a peculiarly interesting specimen of that variety of club-foot technically styled *Talipes valgus*, which I fortunately obtained for dissection whilst engaged in investigating this subject, in the capital of France. It is not apparent upon a careful inspection of it at the present time, that inflammatory irritation had ever invaded any of the elements or tissues which enter into the constitution of the foot and leg, nor was this the case when the preparation was made, now about two years ago—unless the thickening and induration of the skin and cellular substance, and the production of adventitious *bursæ mucosæ* corresponding with the *new points of pressure* upon the side or top of the foot, may be regarded as possessing this character.

The deformity, then, in the preparation before me, in which the points of the toes are thrown *outward* and backward, the inner margin of the foot downward, and the sole looking backward, is connected with a *permanently shortened* and rigid state of those tendons whose physiological action

tends to incline the foot and toe in this particular position. Hence arises the principle or rule by which the deformity in *any of its species* or varieties may at once be recognized; viz: Those muscles with their corresponding tendons, whose individual or combined action, when *strongly contracted, tend* to its production in a *normal* condition of the parts, are concerned in producing or maintaining the deformity in question. Deformities of the foot (which may be congenital or acquired) have the generic appellation of *Talipes* referring to the ankle, or pastern of a beast, or more classically, perhaps, *Kyllopodia.** Of this, three varieties are distinguishable. 1st. That in which it is turned inward, (*vara,*) 2d. That in which the foot is turned outward, (*valga.;*) and 3d. That in which the foot, from the *extreme extension*, is turned upon itself, and rests upon the ground by the *superior surface* of its phalangeal extremity, (*equina*) called, also, phalangeal club-foot.

It was suggested long ago, that these deformities were caused *primarily* by an irregular conformation of one or more of the tarsal bones, by a defect of *equilibrium* in the action of the muscles which move the foot, or an abnormal insertion of one or more of their tendons. To these I will take the liberty of adding an ingenious supposition of M. Duval, of Paris, which I received from him in a conversation upon this subject. This gentleman is well known as a practical orthopedist of distinction in that capital, and by his numerous memoirs delivered before the French Institute, and the Royal Academy of medicine, upon subjects connected with his speciality. He holds that the *primary* cause of these deformities resides in the cerebro-spinal axis, and that they are in

* From *kullos*, crooked, and *pous-podos*, foot.

fact to be referred to the nervous system *originally*, and secondarily to spasmodic contraction of certain muscles.

This is confessedly hypothetical, especially in reference to much the largest class of these affections which are congenital—but whilst little is, or perhaps ever will be certainly known, of the pathology of the fœtus in utero, we confess that there seems to be some ground for the supposition when we consider the violent and protracted motions of the fœtus in utero, sometimes observed, which, coupled with some other facts connected with practical obstetricy, justifies the inference that the fœtus in utero is more subject to *nervous and spasmodic affections*, than to any other class of diseases.

We are inclined to believe, moreover, that an unnatural and *distorted posture* of the fœtus, during the early periods of gestation, may have occasional agency in the production and maintenance of these deformed developments.

It might be considered appropriate here to consider the supposed influences of mental impression or emotion of the mother during gestation, as an original *primordial* cause of *these*, with other deformities and *marks*. But, whilst this is a deep rooted impression in the popular mind, possessing like most kindred prejudices connected with *occult* matters of science, some *apparent* facts upon which they are predicated; it must be acknowledged that it has been a fertile subject of speculation with physiological and obstetric writers, from which nothing valuable in science has ever resulted. The facts we know, and these are sufficient for our purpose.

Not so with those influences connected with *hereditary descent*—these are ever operative, and extensively so. Like begets like in disease, as well as in health. The records of the profession abound with illustrations of the fact in refer-

ence to the deformities under consideration, and those which are congenital must continue to multiply annually in increasing numbers, unless more attention is bestowed upon the subject of their nature, and the improved methods which science is holding out for their successful treatment.

I could cite numerous instances which have come to my knowledge, in which club-footed children were the offspring of a parent with like deformity; I will cite however only one, the most remarkable. I was consulted in the autumn of 1839 by a young gentleman of the South with double club foot, who assured me that an instance presented in Mississippi in which an entire family of six or seven children, male and female, were the offspring of a club footed father!

Nevertheless it must be regretted, with all the facts and arguments before us, that in this, as well as in many other morbid conditions appertaining to the pathology of *extra* uterine life, the original or starting point of diseased action is surrounded with such obscurity, that its correct interpretation will not speedily, if ever, be obtained.

Whatever may be the cause of any of the varieties of the deformity under consideration—whether the case be congenital or accidental, the weight of the body in the erect position and during locomotion powerfully contributes to augment it. This is especially the case during adolescence, where the subject has been accustomed to an *active life*, and the trunk and superior extremities are correspondingly developed, or where obesity obtains either at the period referred to, or in mature life. I have been repeatedly consulted by those who upon inquiry assured me, that their deformities had augmented more in a few months about the period of life or under the circumstances referred to than in as many years at any former time.

In the first and second species, in which the torsion of the foot is inwards or outwards, the os calcis, cuboides, scaphoides and cuneiform bones experience an abnormal rotation upon the antero-posterior axis of the foot. In the first species, in which the torsion is inwards and which is by far the most common, the os calcis is thrown outwards with its posterior extremity into which the tendo-achilles is inserted, more or less drawn upward, the external margin, and sometimes in extreme *torsion*, part of the *superior surface* of the os cuboides, presents downwards, and the internal tuberosity of the scaphoides is found beneath the internal maleolus. In addition, the points of the toes with the foot are usually thrown transversely inwards, or inwards and backwards and upwards, the plantar surface backwards and upwards, its inner margin presents upwards, and sometimes *forwards and upwards*, and as already indicated the outer margin downwards or downwards and backwards. The muscles with their corresponding tendons ordinarily found *contracted* and concerned in maintaining this deformity, are, the gastrocnemius, soleus and plantaris *mainly*, sometimes the tibialis posticus and anticus are involved, the latter becoming in some degree an *extensor*, and *adductor* of the foot. The flexor propius pollicis, flexors brevae, longus and communis together with the fascia plantaris may or may not be seriously implicated. The peronæi, as might be supposed, are unduly stretched and elongated.

The second species, (K. valga.) of which the specimen above spoken of is an *extreme* example, is much the least common of the three varieties and is *rarely* met with. When seen the posture of the foot will be found, as described already, with the points of the toes directed outwards, outwards and backwards, or backwards and downwards, the in-

ner margin of the foot downwards, or downwards and forwards, the outer margin directed backward or backward and upward—the calcaneum sometimes not at all, generally, we believe, *less* elevated than in the first species. The ossa cuneiformi and metatarsal range experience the same description of rotation as in the first species, but in an opposite direction; the plantar face of the foot, which presents backward and outward, is very *concave* and filled with deep depressions or sulci—the dorsal face is correspondingly *convex*, the internal margin is apparently shortened and offers a considerable concavity, whilst its external border is correspondingly convex and elongated—the great toe is *peculiarly* projecting, and drawn upward and outward, at the same time that the remaining toes are often turned in an opposite direction.

The principal muscles constituting the calf the leg are not as much contracted in this as in the first species described; whilst the *peronæi*, tibialis posticus, flexor propius pollicis, flexor brevis and longus are found extremely tense, contracted, and shortened. The flexors appropriated to the small toe and the one next to it, in the specimen alluded to, are so powerfully contracted as to have *articulating surfaces* at the metatarso-phalangeal articulations, and draw the points of these toes directly toward the external maleolus, whereby their phalanges are reversed, and applied upon their corresponding metatarsal bones. The *elongated* tendons in this deformity are, the tibialis anticus, extensor proprius, and extensor communis digitorum pedis.

I have not had occasion to remark the existence of *anchylosed* club foot—nevertheless we are informed by pathologists that in very ancient cases, the bones lose their natural form, and even become partially or completely *anchylosed.*

In the third species (equina) the heel is forcibly drawn up,

and maintained *permanently* in that position by the contracted condition of the gastrocnemius, soleus &c.; the dorsum of the foot forms a very *open* angle with the leg, its plantar face very concave, the weight of the body is received upon the heads of the metatarsal bones, which form a right angle with the toes.

It only remains to be stated on this branch of our subject, that nature, ever true to herself, establishes in every species and variety of Kyllopodia in which the *individual has walked*, such changes in the epidermis, skin, and sub-cutaneous cellular tissue corresponding with those surfaces which receive the weight of the body in progression, as in effect to constitute a new plantar surface or sole of the foot, whilst the proper plantar surface possesses much of the softness, pliancy, and delicacy of structure found in the cutaneous covering of the dorsum of the foot in its normal position.

The treatment of Kyllopodia, before as well as since its pathology was in some degree rightly estimated, until very recently was attempted by machinery alone. Whilst these measures have been attended with only very partial success, even after the most protracted and *painful* employment of them,—the fact must not be concealed that occasional cures have followed their use in early periods of life, before the muscles and tendons had acquired their adult development and rigidity. Most cases, however, have been either abandoned altogether, or at most the *club-foot boot* has been applied, the ordinary effect of which has been only to harass and irritate the patient.

These unsatisfactory results led surgeons to conceive the division of the tendons as a means of *facilitating* the correction of these deformities,—and although this operation was first performed upon the living human subject by Loreny, as

early as 1784, yet we feel confident that the facts which led him to its *deduction and execution* were known and *recorded* as early at lest as 1769.

The following extracts and translations, from the compilations of M. Paul will place this latter fact beyond the reach of cavil or doubt.

In discussing the subject of wounds of the Tendo Achilles, the writer says:—

"The opinions of the most distinguished authors on Surgery are very much divided, respecting the course to be pursued, when the tendo achilles has been divided by a cutting instrument, or otherwise. Some of these, among whom is M. de la Faye content themselves with an *approximation* of the ends of the divided tendon, and thus maintaining them by posture and the bandage, *without suture*—the majority however advise the latter. M. Heister thinks with de la F. that posture and the bandage, should be employed when these are sufficient to maintain the extremities of the divided tendon in *contact*, but that the *suture* is sometimes *indispensable* for this purpose. *

"M. Mollinelli has given us in the history of the Academy of Bologne (Commentarie Acadamie Scientiari Bononiensi Tom. 2 Par. 1 pp. 189, 196) the details of some cases which throw much light upon this matter, and perhaps settle the question." †

The cases are four in number, in all of which the tendo achilles had been partially or completely divided by accident; in all of them, M. M. removed *sections* of greater or less extent of the extremities of the *gangrened* tendons, in all, the lost substance of the tendon was *re-produced*, and the function of the extremity restored, in periods varying from

* Memoirs, 28th Article, intended to serve as a history of Surgery in the 18th century, and as a suppliment, to 3d volume of the Institutes of Surgery of M. Laurent Heister. By Dr. Paul, 1773. L. Histoire de l'Acadamie de Bologne Tom. 2. Par. 1.

† See Institutions de Chirurgie Par. 2. Sec. 6, Chap. on Suture of the Tendons.

six weeks to three months. These casese are interesting in several points of view, as they prove conclusively the re-production of lost tendon, and, as they are reported in a very succinct manner, we shall extract them without abridgement.

"*Case* 1. A man, aged 48 years, of bad constitution, living in a marshy district, received a wound which divided the tendo achilles of one leg in *nearly half of its thickness.* Some days elapsed before he was brought to the hospital, when the leg was found already tumid, particularly the calf. The inferior margin of the wound had assumed a livid green color, and upon pressure of it a similar colored sanies issued from every part. By the stilet M. Mollinelli discovered a sinus of rather large size, extending nearly to the middle of the calf of the leg, and found a portion of the tendon separated from the integuments inferiorly and laterally. For the purpose of exposing that part of the tendon, the wound was dilated in every direction, when the tendon was found larger and harder than natural, and unfortunately it was found to be gangrenous to the extent of two fingers breadth in length. After vainly attempting to restore the gangrened portion, there remained no other alternative but its extirpation with the knife—the operation for which was dauntlessly sustained by the patient. During this operation the thickened margins of the wound were likewise removed. Soothing and anodyne applications were made to the wound, care being taken not to tighten the bandages beyond what was essential to maintain the dressings, the patient never suffering unless they were tightened beyond this necessity. Succeeding to this, venesection was had recourse to several times, when the leg and wound began to assume a better appearance and condition, nevertheless some uneasiness was constantly experienced in the lower extremity of the divided tendon, which continued tumid and elevated slightly above the adjacent integuments and, to increase the evil, became *gangrenous.* All the remedies had recourse to, proving abortive, there remained no other alternative than the iron or the knife. The proximity of the heel, being not more than a finger's breadth distant, precluded the first, and M. M. not wishing to abandon the patient to his apparently hopeless condition, boldly removed the gangrened portion the *second time.* The same treatment as before was continued, the most perfect rest of the limb being enjoined. The wound

was besides dressed with suppuratives. By this course of treatment, the tumefaction gradually abated, and in two and a half months the wound was cicatrized. The space left by the loss of tendon was filled with a fungous growth, which was manifest after the cicatrization was complete by an elevation at the original seat of injury. The foot having been kept for a long period in *extension*, it was apprehended that this position would continue after cicatrization of the wound, and thereby entail lameness upon the patient for life. The result, however, was more favorable than anticipated, for although some difficulty was experienced in applying the heel to the ground when the patient began to walk, this inconvenience very speedily ceased and finally *he walked with the same facility as before the accident.*

"*Case* 2, Was that of a young man, 24 years of age, who divided his tendo achilles with a scythe to the extent of about one third of its thickness. Pain with violent fever succeeded, when M. M. did not hesitate to make the partial tendinous section *complete*, and opened a sinus besides, which had formed beneath the integuments. The superior extremity withdrew to a small extent upon division; the dressings employed were light and in a short time recovery was *complete.*

"*Case* 3, Is that of a man aged 32 years, who received a very severe wound of the achilles tendon, almost completely severing it transversely. The tendon of the plantaris muscle was so much relaxed as to project from the wound— the projecting tendon was *removed*, and the margins of the wound opened. Extensive abscesses formed beneath the integuments extending to the malleoli which were opened. By the use of retentive bandages, in about two and a half months, this individual recovered the *perfect use* of the injured extremity, and no other effect of the accident remained but an elevation or knot over the site of injury.

"The 4th and last case of M. Mollinelli, was that of a young man of uncommon size, and muscular development, who completely divided his tendo achilles about two fingers breadth from the heel. The accident was disregarded for several days. The superior extremity of the divided tendon had retracted beneath the integuments—the lower extremity was hard and tumefied, especially its wounded surface. Efforts were made to overcome the necessity of using the knife, but these were thwarted by the obstinacy of the disease. Tumefaction and induration daily increased, sinuses formed, some of which broke, hemorrhage ensued from the wound. In this extremity M. M. opened the sinuses over the tendon,

and amputated its tumefied and indurated extremity. The disease persisting, the inferior end of the tendon began to swell—this did not attain the size of the first, but its persistence required its amputation, when not more than two lines of tendon remained attached to the calcis. Succeeding the last operation a new aspect presented, and in a short time the wound closed by granulations. The patient would permit no other dressings than a simple retentive bandage, nor would he allow flexion or extension of the foot. From his obstinacy, the os calcis was found considerably drawn upward by the time he commenced walking, so as to prevent the foot *being placed flat upon the floor*—nevertheless, the recovery was so perfect that it was with difficulty that any difference in the functions of the two members could be perceived—the injured member admitting of every variety of motion."

The commentator, M. Paul, makes the following just reflections. "We perceive by the observations of M. Mollinelli, as well as by a single case of Gaingeot, that it is not necessary in order to insure union of the divided tendo achilles, to *approximate the extremities*, either by posture and the bandage, or by the suture, as had been previously practiced. Besides, in the observations presented, the *loss of substance was such* that no means could possibly effect it.

"These important observations had not been cited by any preceding writer on surgery, and it is surprising that they should be unknown to so learned an author as M. Heister."

In the January number of the Journal of Medicine of Dijon, for 1769, (pp. 56, 78,) *M. Hoin*, a member of the Academy of Medicine and Surgery of that city, wherein he resided, reported a number of experiments confirmatory of the observations of M. Mollinelli. He divided the tendo achilles of cats and dogs, partially and completely, and although *abandoned without special treatment*, they invariably recovered. The exclusion of atmospheric air from wounds was regarded as indispensable to safety and success, by many of the older

surgeons, but this precaution as stated was not observed in the above experiments.

These observations and experiments undoubtedly led to the suggestion of Tenotomy, or the division of tendons, as a surgical operation, which, as far as the records of the art inform us, was first performed by *Lorenz*, of Frankfort, who has been already spoken of. He practiced a section of the tendo achilles in the case of a young woman, aged 17 years, the 26th March, 1794, by making a *complete division of all the soft parts* embracing the tendon, from its anterior limits posteriorly. This allowed of an immediate descent of the os calcis, to the extent of *two inches.* A bandage maintained it in that position, and in six weeks the wound was closed. This observation was published by Thelenius in 1789.

In the year 1811, Dr. Michaelis, of *Marbourg*, divided the tendons in three cases of K. equina and one of K. vara—in the latter the tendon of the *tibialis anticus* was *alone* divided. He assures us that the first three cases were restored in a month.

Sartorius, of the Duchy of Nassau, in 1812 proposed and executed another method of operating. He made a longitudinal incision along the side, and parallel with the tendo achilles, opened its theca to the extent of admitting a grooved director, upon which a section of the tendon was made with a straight bistoury.

The individual, he assures us, upon whom this operation was performed walked upon the back or top of the foot;—the foot was flexed immediately after the operation and by maintaining it thus the cure was nearly radical.

Delpech was the first to propose a division of the tendon *without dividing the skin* covering it. The 9th May, 1816, he operated upon a child 6 years of age, by transfixing the leg in front of the tendon with a sharp pointed bistoury, in-

cising the skin to the extent of an inch on each side, and then dividing the tendon with a *convex* knife, without further division of the integuments. Delpech favored *union of the divided* tendon, by maintaining the foot in *extension for twenty-eight days*, when he supposed this result had taken place. Then *gradual* flexion of the foot upon the leg was effected, with a view of *elongating* the newly formed medium, uniting the cut extremities of the tendon. The flexion was painful, but in 8 days the foot was brought to its normal position. This operation was followed by high *inflammatory irritation*, and the wound at the expiration of three months had *not closed*, whilst some obliquity of the foot existed. Twenty years after this operation, the subject of it who was (and probably is yet,) living, was examined by *M. Bouviel*, of Paris, and reported to the Royal Academy of Medicine. He mentions the gratifying fact that there remained at the time his examination was made, only a slight deviation or lameness, not sufficient to prevent the individual from making long walks free from fatigue.

This partial success of Delpech did not encourage him to operate again, nor had he any imitators until 1833 '4, when *Stromeyer*, of Hanover, published six new cases of tenotomy after the *manner* of Delpech modified.

This modification consisted in passing a convex, sharp pointed knife in *front* of the tendon, (thereby endangering, we believe, a wound of the posterior tibial vessels and nerves) allowing the point barely to issue through the integuments on the opposite side—when the operation was completed without enlarging the cutaneous punctures.

He flexed the foot at the expiration of ten days in adult cases, and five for children,—in this particular at least, imitating the practice of Delpech.

The operation and treatment *failed* in the case of a child,

in which eight days were allowed to elapse after the operation, before flexion &c. was commenced.

Five out of the six cases were cured, four of which were K. vara and two K. equina. The youngest was aged seven years, the eldest 32. Mechanical means alone had been used unsuccessfully in two of these cases: third case apparently cured by the same treatment, suffered a *relapse.* In one case the operation of tenotomy was preceded by the use of mechanical means, in the other five tenotomy was first performed.

In one case section of the tendo achilles was preceded by a section of the tendon of the great toe—in another it was succeeded by a similar operation upon that of the extensor proprius pollicis pedis.

The duration of treatment was a month in the two first cases, five weeks for the third, six weeks for the fourth, and two months for the fifth case.

We are indebted for most of the facts in the brief history of the different manuals of tenotomy, which had been practiced prior to the year 1835, detailed in the last few pages, to the report of M. M. Blandin, Emery, and Velpeau, made to the Royal Academy of Medicine of Paris, upon "a memoir on the treatment of Club-foot by a section of the tendo achilles. By M. Bouvier."

From this report, a copy of which was presented to me by M. Bouvier, (through whose courtesy I had the opportunity of visiting his private orthopedic establishment,) I will in further illustration of this, and some other matters appertaining to this branch of our subject, add a few extracts and translations.

"Shortly after the publication of Stromeyer's cases, and in the month of February, 1835, M. Bouvier, assisted by the younger Berard, intended operating for club-foot, but for the unfortunate death of the patient from acute disease. To-

ward the conclusion of that year Bouvier and Duval performed tenotomy almost simultaneously in Paris."

As it is believed that Bouvier (whose manual for tenotomy we witnessed as practiced by himself at the Hotel Dieu of Paris,) has made some important and practical modifications in this particular, we will first, for the benefit of those who may determine to execute the operation, make the following literal translation.

"Bouvier has suppressed one of the openings and never makes but *one* cutaneous incision in executing tenotomy; he gives to the blade of his bistoury a remarkable degree of narrowness and delicacy; he also takes the precaution to avoid detaching and separating the cellular substance surrounding the tendon—as well as to preserve, as far as possible, the integrity of its cellular sheath, believing this to have an important part to perform in the process of reparation; he gives the least possible pain consequently; opens few vessels, thereby avoiding ecchymosis, a constant attendant upon the operation as before practiced, which again circumscribes inflammatory action in the progress of re-union within very narrow limits. Finally, flexion of the foot is commenced *immediately* after the operation by the application of appariel for this particular object, avoiding the excitation of pain or uneasiness in the seat of operation.

"In operating, the patient lies in the recumbent position upon the breast and abdomen, the feet and legs projecting over the side of a bed or table, the foot supported by an aid, who, by exerting some flexion upon it, renders the tendo achilles somewhat tense. Then with the point of a thumb lancet or common bistoury, an incision of very limited extent is made through the integuments upon the side of the tendon, and in a longitudinal direction opposite its greatest prominence. Through the incision thus made, a narrow, convex, probe pointed bistoury is introduced, with which a passage is easily made, by separating the cellular substance, without endangering a puncture of the skin on the opposite side, a section of the tendon is made as in the procedure of Stromeyer.

"After practicing the operation as described four times with the greatest success, M. B. employed in a fifth operation another procedure, which consisted in the use of a narrow,

blunt pointed *concave* bistoury, introduced through the cutaneous incision made as before, the instrument is then carried between the skin and the *posterior* face of the tendon, the latter is then divided from behind forward, giving to the wound a longitudinal direction. M. B. calls his instrument a *tenotome*, which from the thinness of its blade leaves but a very slight trace of its passage. A straight, sharp pointed bistoury may be made equally to subserve the purpose in executing the entire operation as described.

"One of the members of this commission, who invited M. Bouvier to practice this operation in the service with which he is charged, testifies to his ability and the excellency of his procedure, by which in eighteen days he succeeded in giving free use to the member of a man who had been deprived of it for 25 years.

"Delpech and Stromeyer allowed a certain period to elapse, when they supposed that the substance which serves as the medium of union between the ends of the divided tendon, had acquired a certain degree of consistence before attempting to restore the normal position of the foot. M. Bouvier, as already indicated, commenced the restoration of the foot *immediately* after the tendon had been divided, by applying an appariel, which not only maintained the degree of flexion already attained, but tended to augment it—at the same time preventing the inward inclination of the foot.

"The predecessors of M. B. temporised, fearful that the divided tendon might not re-unite. This apprehension is without foundation, inasmuch as we have seen in the case reported by Thelenius, that despite the wound of the integuments, and the extensive wound resulting from the tendinous division, and the separation of its margins, it cicatrized rapidly, and the patient walked with considerable promptness. The same is true of the observation reported by Sartorius."

In further illustration and confirmation of the truth of this position, it is only necessary to study the cases already reported from M. Mollinelli where we have seen that extensive *sections* of the *sphacelated* tendon were removed, in a succession of cases, wherein the *lost* structure was completely restored, and likewise the muscular and tendinous function. From this we pass to a subject of no less moment to the practical orthopedist and, we may add, of interest to the speculative physiologist—we refer to the physiology or me-

chanism of re-union of divided and *retracted* tendons. This subject has not been over-looked or neglected by M. Bouvier, and his experiments, as far as I am informed, are the only *conclusive* essays on the subject. We will give our readers an opportunity of forming their own opinions, by adducing the following important extract.

"The mechanism of re-union has been also studied by M. Bouvier. On the second or third day after tendinous section had been made, he found the cellular theca or sheath of the tendon thickened and more consistent than natural, and opened only the side where the instrument had penetrated, embracing both extremities of the divided tendon. Its internal surface was ecchymosed, of a bright red tint, in contact with itself or with the tendinous extremities which offered like discoloration of their surfaces.

"By the ninth day the connection which they formed was already consolidated, and adherent to the ends of a grey colored substance without any appearance of fibres. The contracted canal was without an opening, its walls being in contact and generally empty. M. B. has found it partly filled with partially coagulated blood.

It is toward the twelfth or thirteenth day that the canal begins to be effaced, and by the eighteenth it forms a resisting cord of like volume with the original tendon, and adhering to its extremities. The canal has nearly disappeared by this date, the tissue being compact and slightly infiltrated with a serous fluid begins to offer a fibrous structure.

"The twenty-fourth day the intermediate substance is found analogous to fibrous tissue, smaller than the tendon itself, endowed with great strength of resistance and solidity, no traces left of the inflammatory action which produced it.

"Examined the thirty-fifth day this substance was found perfectly continuous with the tendon but distinguishable from it.

"About the seventy-sixth day it presented the same appearances as the tendon of *another animal*, but distinguishable from it, by possessing greater solidity.

"With these facts, M. B. considers it demonstrated, that the formation of *new* tendon is due to the surrounding cellular tissue, first converted into a canal with distinct contiguous walls, which undergoes a gradual transformation into a solid fibrous cord.

The causes which concur to this re-union are, on the one

hand, the natural adherence of the cellular tissue, from which the intermediate substance proceeds, with the external surface of the tendon—on the other hand the accidental adhesions of these fibres, with the ends of the divided tendon and the continuity which is thus established between these, and the tendinous fibres when they have *acquired* the *nature* of the latter."

The novelty of these conclusions respecting the mode of tendinous re-fomation cannot fail to engage the attention of the reader. If they should be established by subsequent experiments, they are decidedly subversive of the generally received doctrines of re-production of lost parts as applied to other organized animal structures. Nor can we subscribe hastily to this anti-Hunterian philosophy as applied to tendinous tissues without much limitation, especially as the facts of his experiments as detailed do not lead us to the same conclusions with our respected and learned author.

A case of some interest occurred several years ago in the Philadelphia Alms-house Infirmary, in the service of our learned and esteemed friend and late preceptor, Professor W. E. Horner, of the University of Pennsylvania, which reflects some additional light upon the subject of tendinous re-formation, and which may not be known to the profession. It will be found reported by Dr. H. in the Medical Recorder, or one of the early numbers of the "American Journal of the Medical Sciences."

The facts are briefly these—A case of rupture of the tendo achilles presented, and was treated after the ordinary surgery in such cases, viz.; by the employment of an appariel for maintaining extreme extension of the foot upon the leg. After waiting greatly beyond the usual period for solid *union* to take place, the ruptured tendon was found un-united, agreeably to the commonly received hypothethis on the sub-

ject. Under this embarrassing and apparently hopeless condition of the patient, Dr. H., doubtless influenced by the principles and practice first proposed and employed successfully by his venerable predecessor, the late Prof. Physick, in ununited osseous fracture, passed a seton between the ends of the retracted tendon. Continuing to act upon the same principles as in treatment of pseudo-arthrosis referred to, the seton was allowed to remain, until it was supposed that the requisite degree of inflammation was superinduced when it was withdrawn. After the lapse of some weeks, not exceeding two months, according to our recollection, the Doctor by preserving rest, extension of the foot, &c. of the limb had the happiness of witnessing the success of his operation, and the final restoration of his unfortunate patient. Query.—Was the cure in this case the result of mediate or immediate union of the ruptured tendon? We confess for ourselves, that, enlightened by the facts recorded by M. Mollinelli, as well as the circumstances which it seems to us must obtain in every case of divided tendo achilles, viz.; retraction and more or less *separation* of its extremities—we are decidedly inclined to the opinion already intimated, that original tendinous re-formation must take place in the process of reparation. It is also entirely inferable analogically, in the absence of closely observed and *noted facts* in reference to a decision of this important subject, that in no case of rupture of the tendo achilles is it possible to bring the ends of the retracted tendon into actual contact, and that the union must of necessity be *mediate.* It was this impression, doubtless, which induced Heister, De la Faye, and others of former times, to advise a suture of the tendon when divided, and it is even doubtful whether it could be accomplished *completely*, by as gross surgery as this would now be regarded. In every case

of section of the tendon, which I have executed, or seen performed, a *chasm* is *immediately* seen and felt between the ends, which nothing but *re-deposition* can efface completely. A fatiguing and painful extension of the foot, continued for weeks and months, is not called for, then, as is the common practice in rupture of the tendo achilles—and enlightened by the facts of science, as they now stand recorded, this practice must and will be modified.

To return. It is but justice to my friend, Prof. Horner, to mention that, in a recent conversation with him in Louisville respecting his case of seton of the tendo-achilles, he considers it to be one of the *incipient* steps, which led to the adoption of an operation which it is our present object to consider. Whether, after the history of the subject already given, my readers will be induced to adopt a similar conclusion or not, the case is alike honorable to him who must be regarded, as he has been entitled, the father of American surgery, and to the gentleman immediately concerned.

There yet remains another subject to be mentioned, which may be considered as bearing some relation to that under consideration; my allusion is to *myotomy*, or section of the muscles. Apt illustrations of this operation will be found in that for torti-collis or wry-neck, by a section of the sterno-mastoid muscle; sections of the levator palpebræ superioris, of the sphincter ani; to which may be added the practice now employed with some success in Europe, in the treatment of certain deviations of the spinal column, by sections of one or more of the long muscles of the back; and, we may add, divisions of the contracted palmar aponeurosis. But it seems to me that tenotomy, for the cure of club-foot, could not have been deduced from any of the operations practiced upon the muscles, without original facts and expe-

riments connected with the large tendons themselves. It would have been, in other words, reprehensible to attempt the cure of club-foot by a division of the tendo-achilles, without the most *indubitable evidence* that its function would not thereby have been destroyed, or even materially impaired; as such a result would have left the individual in an incomparably worse condition, than the most frightful deformity, with the capacity of tolerable locomotion. Again, original observations or experiments were indispensable, besides those referred to, because it is familiar to surgeons and pathologists, that muscular substance when lost, is not repaired by the redeposition of the same tissue; and that its function consequently must be partially, if not completely lost.

Of this fact I was skeptical until a few years since, whilst a resident and practitioner of the city of Lexington, when the following case presented.

I was summoned in haste, a short distance into the country, to see a man who was bleeding from an incised wound of the leg, inflicted accidently by a scythe in mowing. Before my arrival, he had been transferred from the meadow to the house. The plexus of flexor muscles which lie against the outer aspect of the tibia and between it and the fibula had been deeply divided by a transverse wound, near the middle of the leg. The hæmorrhage from some divided branches of the anterior tibial artery, although profuse at first, was of short duration and did not require a ligature. The flexor communis was apparently divided, whilst the tibialis anticus and flexor proprius were not entirely severed. The ends of the divided muscles had, moreover, retracted, leaving a sulcus which admitted the ends of two or three fingers. A roller was applied methodically from the toes upward, and another from above the knee joint downwards,

meeting at the wound with the design of approximating the retracted ends of the divided muscles as near as possible. As a farther means of fulfilling the same indication, the foot was maintained in extreme flexion. In a few days I learned that my patient had disregarded the injunctions of quietude, and had been upon his feet attempting to walk. The appareil was re-adjusted immediately, and several times afterwards necessarily, before the wound cicatrized, which took place in about 20 days. It is proper to state that it was impracticable by the most careful application of the rollers, &c. to completely obliterate the vacuity at the point of incision.

Some weeks after the wound healed I was informed that much suffering was experienced in every attempt to walk, and that more or less pain in the foot and lower part of the leg, was experienced at all times in the injured limb—with a request to visit him. Nothing remarkable at this time presenting in the appearance of the injured extremity, I was induced to attribute the remaining disability to a partial division of that plexus of the anterior tibial nerve found winding over the flexor communis, to be distributed upon the dorsum of the foot—and to conclude that his distress was neuralgic. No permanent benefit followed a prescription founded on this view of the case, and on examination it was found that a depression or gap existed in the original site of the injury, imparting through the skin a soft puffy sensation, and of sufficient magnitude to receive a finger, pressed longitudinally into it; the un-united condition of the divided muscular fibres was evident. Moreover, on every renewal of flexion of the foot, the injured muscles were found greatly at fault.

Early the ensuing autumn, several months after the accident, the disability continuing, the man was brought to town

and submitted to the following operation. A longitudinal incision was made over the centre of the depressible point, and the retracted ends of the muscles exposed. The vacuity beneath the integuments was *partially* filled with *cellular substance* of different density—mostly lax and soft. This constituted the only medium of connexion between the retracted muscular fibres, which were variously separated from half an inch to an inch. I then removed carefully this cellular deposit denuding the ends of the muscles. By the aid of adhesives, the roller, posture, &c. the ends of the muscles were approximated as much as possible—but notwithstanding the greater faithfulness of my patient, a very manifest depression was still perceptible, weeks after the wound had closed.

Some improvement in the function of the member resulted from this operation, but disability continued for months afterward and as long as I had any knowledge of the case.

We will recur once more to the report upon M. Bouvier's memoir, for the purpose of epitomizing the four cases which he had then treated, as well as to present his general deductions upon the entire subject. All these cases were accidental, or acquired. Three of them were treated by M. B.; the 4th by M. Roux.

"The subject of the first was a young woman, 14 years of age, who as a consequence of scrofulous abscesses, with numerous cicatrices situated upon the posterior part of the leg, had a very aggravated club-foot, of the third variety, (equina.) The operation performed was after the manual of Stromeyer, slightly modified by Bouvier, and in 24 days the foot was restored to a right angle with the leg. The cure was perfect in three and half months notwithstanding the patient was not entirely governable.

"The second case was that of a man, aged 46 years, who had an accidental club-foot, of the same species as the preceding, produced by the bite of a dog on the heel, at his sixth year. The section of the tendon was practiced the 12th of

February. In twenty-five days the foot was restored to a right angle with the leg, and notwithstanding the formation of a cicatrix upon the heel, the result of improper application of the appareil—the fortieth day he walked with facility. The accidental ulceration required repose for a month.

"The third operation was performed upon a young woman, who had been the subject of hemiplegia of the right side for four years. The abdominal member remained feeble and the foot in permanent extension, which was forced outward and flexed. The operation in this case was practiced by M. Bouvier's second manual, i. e. from the cutaneous aspect of the tendon. In eight days the foot was flexed beyond a right angle, and in a short time the foot could be applied with the sole in a natural position upon the floor and without deviation—but the weakness of the muscles rendered progression unsteady.

"The fourth case belonged to M. Roux. This skilful operator practiced a section of the tendo achilles upon a boy of twelve years, who had been the subject of the same variety of club-foot, since his second year. The 4th of August, 1836, the operation was performed, and the foot brought immediately to near a right angle. The twenty-first day, re-union was complete, from which time progression was easy. This operation was also executed after the second manual of Bouvier.

"The section of the tendo achilles is manifestly an improvement in the treatment of club-foot. The length of time occupied in its treatment by machinery, and the painfulness of the process will not admit of comparison with the brevity of treatment, &c. by a section of the tendo achilles."

M. Bouvier concludes his memoir with the five following propositions, which we consider just.

"1st. Section of the tendo-achilles promptly cures phalangeal club-foot at an age when machinery could exert but limited influence, and in cases hitherto reputed incurable.

"2d. The operation (after my own method,) is as easy in its execution, as it is safe in its results.

"3d. Cures thus obtained can be regarded as permanent, since the patient treated by Delpech twenty years before, enjoyed the complete success of the operation.

"4th. The mechanism of re-union conclusively demonstrates, that the *immediate* separation of the ends of the divided tendon is no obstacle to the re-production of a new tendon equally capable as the original one of supporting the ordinary efforts of the muscles.

"5th. Section of the tendo-achilles abridges the cure of

internal club-foot, when accompanied by a forcible retraction of the extensors of the foot, and allows us to expect a more perfect restoration than has been heretofore obtained by machinery alone."

From my earliest study of practical tenotomy in 1837, '38, during a professional visit to Europe, I became convinced, that if the principles upon which it is predicated, were correct, as I believed them to be, its application would not be confined to those tendons concerned in deformities of the foot alone, and determined to embrace the earliest opportunity for testing the correctness of this opinion. I am now happy to say that I have had no reason to modify this opinion, then formed, in any of its applications (some of which are novel,) which I have had an opportunity of making; and that I do now regard tenotomy as established upon fundamental, scientific principles, susceptible of application whereever permanent muscular and tendinous contractions are concerned in the production and maintenance of deformities.

What remains of this essay, will be appropriated to reports and remarks upon some of the cases of deformity in which I have been consulted, with the results of treatment by a section of the tendons, &c.

Case 1*st.* The first in order of treatment was that of the Rev. Dan'l S. Colgan, of Columbia, Ky.

As a consequence of an extensive burn of the fore-arm, hand, and fingers of one extremity, from accidentally falling into the fire in the absence of his nurse when a child of 18 months old, the fore finger was lost to within about two lines of its first phalangeal articulation, and the middle, ring, and little fingers permanently contracted to various extents. The middle finger was rather more than half flexed upon the hand, resembling a hook; the ring finger was even more flexed, chiefly bent at its first phalangeal articulation, whilst

its two last or distal phalanges were applied nearly flat upon the palmar aspect of the hand, between which and the fingers cutaneous connections existed to within two or three lines of its extremity. The little finger was so much distorted as to have suffered partial dislocation at all its articulations, and in the process of cicatrization so completely buried beneath the integuments of the hand as to elude observation, without a careful inspection. It was thought advisable not to interfere with it, particularly as it presented no actual deformity. The middle finger was first operated upon, the 11th February, 1839, in the presence of, and aided by, professional and other friends of Louisville.

A longitudinal incision of the integuments was first made to the extent of six or eight lines upon the palmar aspect of the finger between its first and second articulations. A small opening was then made through the theca of the flexor tendons, through which the delicate *tenotome* of Bouvier, already described, was introduced, and the sublimis and profundus tendons transversely divided. By very gradual extension, the finger was brought immediately to form a line with the hand, and was thus maintained by a roller and splint applied upon its dorsal surface. The margins of the external incision were approximated by adhesive strips and simple dressings applied. It is worthy of remark that partial *ligamentous* anchylosis at the first metacarpal joint offered considerable temporary resistance in extending the finger, after the principal cause was overcome.

By the 19th of the same month, the wound being nearly cicatrized, and the improved posture of the finger giving Mr. C. satisfaction, at his solicitation the ring finger was subjected to a somewhat similar operation and treatment. The extensive cutaneous adhesions described, first required division, to-

gether with the palmar aponeurosis appropriated to this finger. Tendinous section was then executed as in the first operation, and the finger extended and dressed in a similar manner. From the wide gap in the integuments, which necessarily presented when this finger was restored, cicatrization was not complete before the 22d of March, on which day the gentleman left for the country. At this time both members, subjected to treatment, were nearly in a line with the hand, which posture he was advised to preserve for some succeeding weeks.

It was particularly observed during the successive divisions of the skin, aponeurosis, and tendons, executed in the last operation, that the obstacle to extension was not overcome until the section of the tendons was completed.

From the nature and extent of the injury, thirty-five years before, producing deep and extensive cicatrices of the fore-arm, hand, and fingers, with *anchylosis* of the first phalangeal articulations, more than partial recovery of the *functions* of the fingers was not to be expected, nor was promised. Some months succeeding the treatment, however, I had an opportunity of inspecting them, when some power of flexion and extension was enjoyed—the middle finger could be brought in apposition with the thumb and thus made to subserve many valuable purposes. In addition to which Mr. C. was greatly gratified with the result, as he could now present his *fingers* with the hand and arm in the extended position, so essential in gesticulation.

Case 2d, Was that of a colored girl, Cornelia, aged about 10 years, belonging to Mrs. J., of this city. She was represented as being of healthy conformation at birth. This was preserved until she was about thirty months old, walking with the ordinary facility of children of that age, when she was

attacked with pains in her lower extremities. At the expiration of about three months these *pains* subsided, leaving *both* lower extremities extensively deformed, in such manner and degree that she has not been able to move in the erect posture since. Her general health has been good. This is the brief and imperfect history of the case obtained up to the month of April, 1839, when she was first submitted to particular examination.

The deformities were found to involve five principal articulations, i. e. she had double *Kyllopodia Equina*, inclining to *K. vara*, (the feet and toes tending inward,) both legs flexed upon the thighs to less than a right angle, and from a slight contraction of the tensor vagina femoris of the left side, the thigh was slightly flexed upon the pelvis.

By reference to the cut, (Fig. 1.) taken from a drawing which I made from a cast of the deformity of the *left* extremity, prior to the operation, a correct estimate may be formed of the *double* deformity of the foot, and at the knee joint, and of *both* limbs, with a very slight exception. The difference between the limbs was to be observed in the greater atrophy of the left, from which the cast was taken, in addition to which the flexion of the leg was greatest in this limb, whilst the extension and curvation of the right foot was greater than the left. The resemblance of the deformities, however, in kind and degree in comparing the limbs was so great as to supercede the necessity of delineating both.

The trunk and upper extremities were developed greatly beyond one of her years—which doubtless is referable to the extraordinary exercise to which they were subjected in her method of progression in the *sitting* position. The arms were employed in moving, not unlike *crutches*, by successively placing them in front of the body, resting upon the palms of

the hands, and drawing the body after them. The weight of the trunk, &c. rested principally upon the *right* nates, thigh, and leg.

After this manner, the feet and legs drawn close beneath, and to the side of the *left* nates, she was enabled to perform a species of locomotion upon a plane surface, and to ascend and descend, at a slow progress, the stair way. After what has been stated, it will readily be perceived why the *left* limb generally was less developed than the right.

The 19th day of April, 1839, I performed tenotomy upon the right tendo achilles. I had on this occasion the presence and kind assistance of several professional friends of Louisville. The foot was easily flexed to some extent immediately after the operation, so that the deformity was reduced about one-half, the ends of the divided tendon were found separated six to eight lines, and by the fourteenth day the foot had been gradually brought, by the employment of an appareil devised for the case, to a right angle with the leg.

The slight incision of the integuments, but little greater than that of common venesection, adhered in twenty-four hours, and by the twenty-first day the chasm between the ends of the divided and retracted tendon was completely filled, leaving no sensible inequality.

The 11th of May just three weeks after the first operation, I executed a section of the tendon of the biceps flexor cruris of the same (right) limb.

By the seventh day after this operation the leg had been gradually extended to a straight line with the thigh, by an apparatus somewhat similar to that of Amesbury's for fractures. This appareil, devised for the occasion, maintained the foot simultaneousiy in a normal position with the leg. In about a month this was removed and some motion com-

menced at the knee and ankle joints. The capacity for complete flexion and extension of the leg upon the thigh was rapidly acquired, and appeared to be perfect in degree and force, after a month to six weeks daily exercise. During the application of the last apparatus, it was subsequently ascertained, the patient had from time to time clandestinely removed the foot from the shoe attached to the heel piece, by which the heel rested against the os calcis.

This is mentioned as a circumstance which should be scrupulously guarded against under like circumstances, inasmuch as soreness and ulceration are the almost certain consequences. This unpleasant effect resulted in the present instance, creating a delay of many weeks in the progress of the case.

In the months of July and August succeeding, the first exercise in the *erect* posture was commenced, by the aid of crutches. These essays were regarded as sufficiently flattering, notwithstanding the want of muscular power and remaining soreness complained of in the recently *ulcerated* surface. Exercise of the limb was now resumed in the *sitting posture*, and maintained daily, for several months with as much assiduity as could be attained, with a view of developing size, strength, &c. In this I was not disappointed, as its increase in bulk and strength was very noticeable, and by the month of November the patient again commenced exercise erect with less timidity and fatigue than before. Notwithstanding, a few minutes in the erect posture excited a great degree of muscular tremor and uneasiness in the limb generally.

The *contrast* in the size of the extremities increasing, the right continuing to augment in *length* as well as bulk, determined me to treat the left *immediately*, if for no other purpose than to favour its growth—its *prospective* aid in erect locomotion being all that was *then* anticipated.

The 3d December I made a section of the biceps flexor cruris on the one hand, and of the semi-tendinosus and membranosus on the other, at my private lecture room, aided by several professional friends, and in the presence of a number of medical students and other gentlemen.

In about twelve days from the date of this operation, the leg had been gradually extended in a line with the thigh, and thus maintained about two months before muscular motion was allowed. Circumstances progressing favourably, tenotomy upon the *left* tendo-achilles was performed the 20th January 1840. The eighteenth day succeeding this operation, by gradual movements of the apparatus every second day, the foot was brought slightly *within* a right angle. The modified appareil of Amesbury, with the foot piece, was now applied as before, fulfilling like indications. This was worn about two months, and tendinous re-formation being considered perfect, it was permanently withdrawn and the freest muscular motion allowed and encouraged. Attention was now particularly directed to the *right* extremity again, the main dependence for immediate *erect* locomotion.

It had continued to develope in the interval of treatment bestowed upon the left, and extension and flexion of the leg were considered *perfect* by several professional gentlemen who saw and examined it with me; notwithstanding, *soreness* and *pain* were complained of in the *tendo-achilles*, whenever she walked.

The unfortunate ulceration of the integuments covering the heel, had in fact caused some *contraction* of the tendon, and consequent extension of the foot *beyond* a *right* angle upon the leg.—This disability not improving by exercise up to the early part of April last, determined me to operate a *second* time upon the right tendo-achilles.

A *re-section* of this tendon was accordingly executed on the sixth day of April, and an apparatus immediately applied by which in a few days the foot was brought into *extreme* flexion upon the leg. Considering the *second* tendinous union as solid by the 1st of June, the patient commenced to walk again with her crutches, under very *improved* circumstances. By frequently repeated, daily exercise she was soon capacitated to walk about the house and yard, in considerable comfort, with increasing strength and assurance.

About the middle of the present month, (August,) I find my patient continues to improve in every respect, so much so, that she is capable of walking or standing upon her feet two hours or more uninterruptedly with but little fatigue. In addition, the left limb within the last few days has been brought into requisition, and aids materially in standing or progression, by resting upon the points of the toes—the heel of this limb not reaching the ground by about two inches and a half.

Her general health remains, as it has been, uniformly good. No inequalities in the the tendon operated upon exist, nor is there any perceptible want of the most perfect continuity and consolidation of structure at the points where tendinous sections were made. Of this I am fully convinced from a recent examination made in connection with my friend, Prof. Horner, who equally satisfied himself on this subject.

The delineation marked No. 2, of the accompanying cut, is from a drawing from nature which I made of one of the restored extremities, about two weeks since—it represents the present position of it, in an erect or standing attitude.

Remarks.—The multiplicity of deformities, complicating this case, and destroying erect locomotion for a period of nearly nine years—taken in connection with the success at-

tending the application of the principles of tenotomy to the tendons of the flexor *muscles of the legs*, renders it, so far as my observation and reading extend, *entirely unique*. It is, besides, well calculated to encourage us in subsequent applications of tenotomy in similar pathological conditions, in *whatever part located*. This leads me to allude to a highly important application of the same principle to the treatment of strabismus or squinting, by Prof. Dieffenbach, of Germany. This ingenious surgeon has divided the internal rectus muscle (or rather, tendon I conclude,) of the eye in internal strabismus, with success. Several similar cases have appeared in the "London Lancet,"* in which this operation has been successful in the hands of P. B. Lucas, Esq.

And we conclude that the same operation may be applied to the rectus externus, internal oblique, and tendons of other muscles of the eye, where these are found concerned in the production of abnormal direction of the axis of that organ.

The same pathological states will, no doubt, be found in the muscles and tendons of the thoracic extremity, besides the illustrations contained in the first cases which I treated.

This essay might be protracted, by considering certain subjects *indirectly* connected with tenotomy, but it has already equalled the limits contemplated in the outset.

Reference is more particularly had to the manuals, which I have found safest for executing tenotomy at the popliteal region—together with Wm. Bennet's details of his modications of Dieffenbach's operation upon the rectus internus oculi.

The most suitable age for treating congenital Kyllopodia, when this can be selected, as well as the whole subject of anchylosis, the correct diagnosis of which becomes so indispensa-

*London Lancet, May 2d, 1840. p. 188.

ble in the interpretation of deformity in certain cases, are not less intimately associated with our subject.

I have found it safest in operating at the ham to make the preliminary incision through the skin on the *inner side* of the centre of the flexor tendons, and to introduce the tenotome from *within outward*, so as to make the section of the tendons from *without inward*. This is founded upon the relations sustained between the popliteal nerves and the tendons. These nerves after descending to about the centre of the popliteal space, are found in the remainder of their course through this region, to lie almost in *contact* with the *inner aspect* of the flexor tendons. The section of the tendon being made from without inward, so soon as the section is complete, (evidenced by its sensible contraction,) the instrument should be withdrawn and the nerve is safe, whereas it is possible if passed first around the inner side of the tendon the accompanying nerve will be embraced.

This modification I have also made in operating upon the tendo-achilles with a similar view of avoiding a wound of the posterior tibial artery and nerve.

In only one instance have I declined operating for Kyllopodia from the tender *age* of the patient.

This was an interesting and vigorous child of *four months old*, brought by its parents from a distant state last year, which I advised to be brought back when it had attained its second year.

Doubtless tenotomy, so far as this alone is concerned, might be safely executed at a very early age, and when the torsion of the foot would offer the least obstacle to redress, but I should not feel inclined to impose the necessary restraints of the restoring appareil when the excitability of the nervous and vascular systems are known to be most exalted. From

the fifth to the eighteenth year, must be considered as a very favorable age for treating any of the varieties of Kyllopodia. In illustration of the third and last topic named, of collateral importance in *practical tenotomy*, I will only add the following instructive case, in which tenotomy was *unsuccessful.*

Mrs. M. at about forty years, as a consequence of acute articular rheumatism, three years before, of the right knee joint, had the leg permanently flexed upon the thigh, about one third—i. e. it formed a very open angle with the thigh. The leg could be *permanently* flexed, but did not admit of extension beyond the degree named, and consequently lameness existed. It was evident enough that partial anchylosis existed in the knee joint, but inasmuch as the flexor tendons of the leg were rendered tense, in efforts at complete extension of the leg, the degree of agency which these exerted in maintaining the abnormal posture could not *a priori* be decided. Besides, preliminary diagnostic essays were resorted to with the original apparatus of Amesbury for fractures, with *perceptible extension* of the leg, beyond what she could *voluntarily* accomplish.

Encouraged somewhat by these trials, and knowing the doubtful nature of the result, this lady solicited the operation of tenotomy.

This operation was accordingly executed about the middle of May, 1839, in which sections of the biceps flexor cruris, and of the semi-membranosus and semi-tendinosus were executed. The limited cutaneous incisions were brought together by adhesives and united without suppuration. The third day succeeding these operations the appareil named was re-applied and by slight and repeated movements in the rack of the machine, the limb was extended *beyond* what it had been in the preliminary treatment.

Nothing was gained after this time, as further effort at extension of the limb produced pain and soreness in the *joint*, and after a short time, all further treatment was abandoned.

Tendinous reformation was as speedy and perfect in this, as in the preceeding operations upon the tendons of the flexors of the leg, and in due time the power of flexing the limb was recovered.

From all the facts as well as the history of Tenotomy in our possession, we feel authorized in advancing the following conclusion, viz.; that there is no variety of Kyllopodia, or any of its *pathological congeners*, recent or old, congenital or acquired—uncomplicated with anchylosis—which is not remediable in a very large proportion of instances by the treatment which we have endeavored to elucidate, and that the most aggravated of these deformities, from age or otherwise, may in like manner be decidedly ameliorated.

August 24th, 1840.

ART. II.—*A Fourth Supplementary Catalogue of the Plants of Kentucky.* By C. W. SHORT, M. D., Professor of Materia Medica and Medical Botany in the Medical Institute of Louisville.

Having several years ago, published in the Transylvania Journal of Medicine, a catalogue of the phenogamous and filicoid plants, native to and naturalized in this state, so far as they had then been observed by me, I afterwards published, in three subsequent numbers of the same Journal, supplementary catalogues of other species, as they became known to me, either by personal observation, or the reports of others competent to determine them. I now offer a *fourth* supplement

to the preceding lists, embracing merely the names of, and a few remarks on, some other plants, which have occurred to my notice in different parts of Kentucky, since the publication of the last. Like the others, this list is arranged alphabetically, without reference to systematic classification.

Ampelopsis cordata, on the banks of the Ohio River.

Aspidium dilatatum.

Aspidium asplenoides.

Acerates angustifolia.

Arabis lyrata, found by Dr. Riddell among the knobs of Greenup county, Ky.

Aronia latifolia, from the same locality, detected by the same botanist.

Anthoxanthum odoratum, (Sweet-scented Vernal grass.) This grass, which imparts such delightful odor to new-mown hay, is becoming gradually naturalized in our meadows.

Adonis autumnalis, (Pheasant's eye.) A showy exotic flower, found in the barrens of Kentucky, where it was introduced from a neighbouring garden.

Allium striatum.

Arenaria serpyllifolia.

Angelica triquinata, barrens of Ky.

Angelica atropurpurea, borders of Rock-Castle River, and other mountainous situations.

Asclepias parviflora. This species, so common in the southern States, has only been observed by me in the wet lands bordering on Green River.

Azalea nudiflora. (Bush Honey-suckle.)

Bumelia tenax, on the rocky banks of Little River, a branch of the Cumberland.

Boltonia glastifolia, swamps around Louisville.

Cyperus filiculmis, Islands of the Ohio.

Cyperus erythrorizos, (Grass nut.) The tubers attached to the roots have very much the taste of the cocoa nut.

Cypripedium candidum, (small white lady-slipper.) This interesting species was first pointed out to me in the barrens of Christian county, by the Rev. Mr. Jones, of Hopkinsville, Kentucky.

Chrysanthemum leucanthemum, (Ox-eye daisy.) A troublesome weed in the Eastern States, which will soon be extensively introduced into the West.

Carex bromoides.

Convolvulus sepium, (Bind-weed.)

Convallaria stellata. I have met with this pretty species only on Corn Island, opposite to Louisville.

Clethra tomentosa. I know this plant, as a native of Kentucky, only through a solitary imperfect specimen gathered by my pupil, the late Dr. Clarendon Peck, among the hills of Licking River.

Desmodium strictum.

Eupatoreum rotundifolium.

Epilobium palustre.

Euchroma pallida, barrens of Kentucky; much less abundant than E. coccinea.

Gaura angustifolia.

Gerardia auriculata, wet lands in the barrens.

Hypericum Virginicum, knobs among the barrens.

Hypericum angulosum, " "

Hypericum nudiflorum, " "

Hieracium Kalmii. This plant, in common with many others, is reputed to possess curative properties in snake bites.

Itea Virginica. This pretty shrub was observed by me for the first time this spring, (1840) among the wet timbered lands bordering on Green River, near Rumsey.

Ilex Canadensis, wet lands of Henderson county.

Ilex prinoides, " " "

Juncus marginatus.

Jussieua grandiflora. This plant, to which so much interest attaches, in consequence of the publication of Dr. Cartwright, in the July number of this Journal, was observed by me in the spring of 1838, in a marsh of Henderson county, Kentucky, ten miles south of the Ohio River. It was rare; but its existence there proved its adaptation to the climate; and if the views lately promulgated as to its health-preserving influences be sustained, it would doubtless be desirable to propagate it extensively in malarious and miasmatic districts.

Lythrum alatum.

Liatris cylindracea.

Leavenworthia aurea.

Leavenworthia uniflora, *Torrey.* Cardamine uniflora, *Mich.* These two little plants occur in common on wet rocks among the barrens. The genus, separated by Torrey from Cardamine, has been very justly dedicated to Dr. Leavenworth, of the United States Army, who has done much towards the elucidation of the botany of Louisiana, Arkansas and Florida, whilst stationed at different posts of the South and West.

Mariscus ovularis.

Plantago pusilla. A diminutive species of plantain, frequent in the pastures of Christian county.

Peplis Americana, common in the poor lands and pastures of Muhlenburg county.

Phlox pilosa. This is distinct from the plant, published under the same name, in a previous catalogue. That is most probably P. aristata, and the present is undoubtedly the genuine P. pilosa of Michaux. It occurs in great abundance in early spring among the barrens; and is a very handsome, low species, with dark purple flowers.

Psoralea congesta,—a new species lately discovered by Dr. Clapp and Mr. Jones,of New Albany, on the Islands of the Ohio River, near that place.

Psoralea latifolia. In thickets among the barrens; rather rare.

Prenanthes Illinoensis, abundant in the barrens of Kentucky, as well as the prairies of Illinois.

Quercus triloba. Observed by Dr. Riddell on the knobs of Greenup county, Ky.

Quercus ilicifolia.

Salix petiolaris, } Two dwarf willows detected by Dr. Clapp
Salix longifolia, } on the Islands of the Ohio River.

Sagittaria lanceolata,

Sisymbrium palustre.

Salvia urticifolia, in the thin oak lands of the barrens.

Styllingia sylvatica, rare—barrens of Kentucky.

Stellaria graminea.

Smyrnium atropurpureum.

Sedum telephoides, first pointed out to us by Dr. Clapp, on the lime-stone cliffs above Utica, on the Indiana shore. It no doubt occurs also in similar situations, on the Kentucky side of the Ohio.

Trillium petiolatum. A species having considerable resemblance to the common T. sessile, but totally distinct; barrens of Ky.

Trichostema brachiata, barrens.

Tripsacum dactyloides, (Gama grass.) A luxuriant grass to which public attention was called a few years since, as an excellent article of provender; a character which further experience has proved it not to deserve. It occurs, as a native, among the grasses of the barrens; and has been introduced into different parts of the state.

Taxodium distichum, (Cypress tree.) This truly valuable timber tree is met with abundantly in the lakes and lagoons of all the counties bordering on the Ohio river, in the West of Kentucky; where the peculiar excrescences called "Cypress Knees" form obstacles in the way of crossing the water-courses.

Verbena spuria, roadsides in the barrens, in common with V. angustifolia.

Wistaria frutescens. A flowering pea-vine, now common in gardens and shrubberies; abundant on the banks of Little River in the West of Kentucky.

Xanthium spinosum. A pestiferous species of cockle-bur, which, it is to be feared, will become extensively naturalized. As yet, I have only met with it on the commons of Portland, below the falls of the Ohio.

Yucca filamentosa, (Adam's thread, Bear-grass, &c.) A showy and ornamental plant frequent in gardens; and which I am informed by the Rev. Mr. Jones, of Hopkinsville, grows abundantly on the Cumberland mountains, in the S. E. corner of Kentucky. An opinion is entertained by some, that the stream which enters the Ohio River at Louisville, derives its its name from this plant, which is supposed to have once grown on its banks. This is most probably erroneous; and it is more likely that the name of the creek was taken from some of those rank and luxuriant grasses, so common in similar alluvions, as Panicum crus-galli, and others.

August, 1840.

REVIEWS.

(*Continued from the September number.*)

Art. III.—*Elements of Pathological Anatomy;* illustrated by numerous engravings. By Samuel D. Gross, M. D. Boston: 1839.

The notices of some of the first chapters this book contained in our last number were a part of the article published in the preceding, the limits of which did not permit an insertion of the whole. The division was made in the absence of the Reviewer, and the article appeared, therefore, without exordium or peroration. With this explanation we proceed to the analysis of other portions of this comprehensive work.

The 15th chapter treats of hydatids. We agree with our author when he affirms, that most American physicians are unacquainted with this subject. It is but justice, however, to add, that, curious and interesting in a physiological and zoological point of view, as these productions may be, their study by the practical physician, is not of very great importance. This results, first from the rarity of hydatids in the human body; and second, from the impossibility in most cases of relieving the patient, when they are known to exist. Nevertheless, every physician ought to have a general knowledge of this class of beings; and such a knowledge can be successfully acquired in a single hour by the study of the dozen pages which our author has devoted to them.

"Hydatids occur in serous cavities, the alimentary canal and the passages which open into it, the cellular tissue, between the muscles, and in the proper substance of the different organs. Nevertheless, there are, as will be seen hereafter, some parts that are more frequently affected than others. They have been found in nearly all classes of animals,—in birds, reptiles, and fishes, as well as in a great many of the mammalia. Whether they exist in insects, is a point which has not been ascertained. No period of life is exempt from them. Portal, indeed, mentions an instance of their having been detected in the fœtus. They are most common, however, in adults and old people.

"So far as can be ascertained, these parasitic beings possess no genital organs, no apparatus for respiration, no trace of a circulation, and apparently no nerves. They can live and propagate their species only in the interior of other animals, and their existence is usually very brief, most of them perishing within the first year or two after they are developed, often much earlier. A few of them only are capable of performing distinct movements, under the influence of external stimulants. The cysticercus, for example, when put in luke-warm water, not only whirls itself about, but alternately protudes and retracts its suckers. The acephalocyst, on the contrary, remains perfectly quiescent, and may therefore be said to be void of irritability and contractility."

Hydatids are naturally divisible into two great classes—the cephalocysts, or those in which a head is associated with the cyst, and acephalocysts, or those in which there is no appearance of such an organ or any other. Of the former our author describes and figures four genera: 1st. The *cysticercus*, or bladder-tailed hydatid, of which he enumerates, with Cloquet, five species; most of which have been found but a single time in the human body, all of them in the plexus choroides and some of them there only. In our domestic animals, as the hog, sheep, ox, and goat, they are more common. 2d. The *polycephalus*, or many-headed hydatid, not yet found in man. 3d. The *diceras*, or two-headed hydatid, observed, once, to have been discharged from the human

bowels. 4th. The *echinococcus*, or rough hydatid, found a single time in the brain, and discharged once from the bladder.

From this enumeration it will be perceived, that the cephalocystic hydatids do not present themselves often enough in the human subject to be of much interest. Their greater frequency, in our domestic animals, constitutes them legitimate objects of epizootic medicine.

The other great class, *acephalocysts*, are much more common in the human body, and therefore more deserving of notice.

"Occurring both in the human subject and in many of the inferior animals, the individuals of this class of parasites infest some organs much more frequently than others. They seem to have a remarkable predilection for the liver, owing, probably, to some peculiarity of structure favoring their development. The brain, ovary, uterus, mammary gland, spleen, and kidney, are also sometimes their seat; in fact, they have been found in every part of the body, except the alimentary canal, the urinary bladder, and the respiratory passages.

"Varying in size between a mustard-seed and a large orange, they are generally of a spherical figure, and composed of a white, semi-opaque, pulpy vesicle, filled with a clear, limpid fluid. This vesicle, which forms the hydatid, properly so called, is from the sixth of a line to the eighth of an inch in thickness, and is often separable into two or more layers, and is so exceedingly delicate as to yield under the slightest pressure of the finger. So weak is it, indeed, that it is frequently incapable of withstanding the pressure of its own contents, as I have had repeated opportunities of witnessing, after the partial removal of the enclosing cyst. On being ruptured, it shrinks up into a soft, irregular, pulpy mass, of an opaline color, which readily swims in water, and bears the greatest resemblance to coagulated white of egg.

"It sometimes happens, though not very often, that a large acephalocyst contains several that are smaller, one within the other, all of the same shape and structure. As many as three, four, and even five, have been found thus enclosed, like so many pill-boxes. This arrangement, which occurs much oftener in the human subject than in the inferior animals, is

explained by the endogenous mode of generation previously adverted to, by which one acephalocyst, after having arrived at maturity, produces another, each successive one being smaller than its parent."

Our author like most of his predecessors indulges but little in speculations on the origin of hydatids; yet true to the theory, that most morbid products are the result of inflammatory action he strongly inclines to that view of their origin. In speaking of the causes which develope acephalocysts, he remarks:

"In Cincinnati, where there are annually slaughtered upwards of one hundred thousand hogs, probably not a tenth part are free from this disease. Whole droves, consisting of three or four hundred head, are sometimes thus affected. These animals, most of which are young, are raised in the prairie districts of Ohio, Indiana and Kentucky, and are literally stuffed, for six or eight weeks before being sent to market, with fresh corn. The consequence is, that the portal circle is kept in a state of constant congestion, which finally leads to inflammatory irritation and the development of acephalocysts in the liver and other viscera. The irritation thus set up is of a specific nature, and is followed by the deposition of a fibro-albuminous substance, or, what is the same thing, a sort of plastic lymph, the particles of which arrange themselves in such a manner as to create an inferior being, an entozoic parasite."

Undoubtedly, the great hydatid development in these cases is connected with an increase in the diet of the animal, originating a very active and nutritive process, particularly the adipous system; but we do not admit, that such a condition is necessarily attended with inflammation. In fact, we generally find, that individuals who generate great quantities of fat are less than others inclined to the *phlegmasiæ*, for the secretion of so much fat keeps down plethora. But if excess of nourishment generates hydatids by exciting inflammatory action, how does it happen, as we state in the words of our

author, that in many, ruminants, hydatids may be produced almost at pleasure, by confining them in moist situations, and restricting them to very juicy unripe vegetables? Is this a regimen, which is likely to raise inflammation? Under both modifications of diet we see causes which are calculated to affect the nutritive and secretory functions, and nothing more. If these causes excite inflammation, that state cannot explain the development of hydatids; inasmuch as there is no necessary connection, between the state of an inflammed part and the formation in it of an entozoa. If inflammation could give birth to hydatids, how does it happen, that we do not find them as frequently, as we find the acknowledged products of that pathological condition? Should an organ be at the same time affected with hydatids and inflammation, it would not follow that the latter was the cause of the former. It would be less gratuitous to affirm the reverse, and assign the hydatids as the cause of the inflammation. The origin of hydatids and all other entozoa, not known to exist out of the living body, presents us with a problem in transcendental physiology; but the remote causes which favor their development, are legitimate objects of study, and should be ascertained that they may be avoided.

Chapter xvi. treats of serous cysts. These productions bear a marked resemblance to the second great division of hydatids—the acephalocystic. They differ, however, from the latter, in being always attached to the adjoining normal tissues, which supply them with blood vessels. They are sometimes solitary and simple, that is consisting of a single cavity; at other times, this cavity is subdivided, by processes of the membrane which constitutes its parietes, and it then becomes multilocular; in which case the different cells may contain fluids very unlike each other, as serum, pus, blood,

fat, a honey like substance, &c. Finally, a great number of simple cysts may be aggregated in one cavity, attached directly to its parietes, or indirectly by being joined to each other.

"It will be recollected that these different classes of cysts are the result, in most instances, of an entirely new formation, dependent upon a perverted state of the nutritive function. In other cases, they appear to be formed out of pre-existing textures, sometimes of a serous, at other times of a mucous nature. To the former category belong the cysts, which are so often found in the ovaries, in consequence of the enlargement of the vesicles of De Graaf; to the latter, those which are developed in the kidneys and in the female breasts, from obstruction of the excretory duct. In these situations it is not uncommon for the adventitious growth to receive an accidental covering from the organ in which it is located. In the ovaries, for example, we accordingly find that the cyst is usually provided with very thick, dense parietes, separable into three distinct layers, the internal of which consists of the capsule of the vesicle of De Graaf, the second of the albugineous, and the third of the peritonæal coat of the organ. The same thing is sometimes observed in the spleen and liver. It is worthy of remark here, that, when the cyst is formed out of pre-existing mucous membrane, as in the instances above referred to, it generally, in the course of a short period, assumes all the properties of the serous textures."

These cysts may be regarded as secretory surfaces without excretory ducts, and hence the extraordinary dimensions to which many of them attain. By the stimulus of distension their growth is kept *pari passu* with the increase of the secreted fluid. We have seen an ovarian cyst come at last, to equal in capacity the gravid uterus at the full term of gestation. When the cyst has arrived at this magnitude, the patient exhibits all the characteristic symptoms of ascites. We have, at this time, two female patients, in each of whom an ovarian cyst has come to fill the cavity of the abdomen, with such uniformity and to such extent, that but for a refer-

ence to their early history their true anatomical history could not be known.

The study of serous cysts is interesting to the surgeon. When they are not natural cavities enlarged, but adventitious productions, they are, in all cases, manifestly allied to those semi-solid, atheromatous and steatomatous tumours, so often met with in the sub-cutaneous cellular tissue, and known under the name of wens. Even these, however, may be natural cellules, in a state of hypertrophy, reinforced in their parietes by new deposits of nutritive matter, or by the condensation of the surrounding cellular tissue. Thus an obstructed sebaceous follicle may, in the the opinion of Sir Astley Cooper, expand into an atheroma; and the fatty encysted tumours generally, may be nothing more than hypertrophied adipous vesicles.

With this subject, we conclude that part of the work before us, which treats of analogous and transformed tissues. The next chapter, divided into several sections, is devoted to the heterologous formations; the transition to which is easy and natural, inasmuch as the encysted tumours, are associated in our minds with those heterologous masses, which constitute some of the most interesting objects of surgery.

In our August No. we indulged in some speculations on the origin of these formations which we shall not now repeat. Professor Gross admits four species:—1. Tubercle, 2. Melanosis, 3. Scirrhus, 4. Encephaloid. We shall say enough under each of these heads to present the view which our author takes of them; but in the present number shall speak only

Of Tubercle. None of the heterologous formations are as frequent, as often seated in vital organs, and as fatal, as this; to which our author has, therefore, very properly devo-

ted more space than to either of the others. He remarks with great propriety, that although not stigmatized with the epithet *malignant*, this is, indeed, one of those productions, to which that term is most appropriate; as no other more certainly or speedily effects the decomposition of the surrounding parts. Tubercle has been found in almost every tissue of the body, but, as all the world knows, especially affects the lungs. There is reason to believe, indeed, that it is never found in any of the other tissues of the adult, without being likewise found in that organ; though it often exists there when it is absent from other parts. Of the causes of this pre-eminent liability of the pulmonary apparatus, we are entirely ignorant, and, therefore, at liberty to indulge in conjectures, which for a moment we shall do. *First.* The external causes which favor the development of tubercles, may be of a kind which exert themselves chiefly on that organ. Among these causes is a cold, damp and confined atmosphere, with sedentary habits—the former acting directly on the organ, the latter indirectly, by reducing the activity of the respiratory function. *Second.* The commencement of the tubercular development may be in the blood, or in the constitution at large, which may make an effort to eliminate the tubercular matter through the lungs, when it may be deposited in the cellular tissue or air vesicles of the organ. If foreign substances are thrown into the bloodvessels, some take the direction of one excretory outlet, others another. Thus, a solution of tartarized antimony brings on diarrhœa, nitrate of potash diuresis, and phosphorus in oil, an exhalation of phosphorous acid from the bronchial tubes. But we shall not insist on these speculations.

Tubercle is deposited at every period of life, from the fœtal state to old age; but the greatest liability is from the 20th to

the 40th year. In children the deposit is not so constantly in the lungs, as in adults; but has a greater disposition to affect the absorbent system and the spleen.

A great number of mammals, birds, reptiles and even insects, are subject to turbercles; impressively showing, that their causes are exceedingly pervading. Observation has rendered it probable, that in all these animals, the deposit is oftener made in the lungs than in any other part. Change to a colder climate, inactivity, confined air and innutritious diet, have appeared to be among the causes of this malady in animals. Their tubercles bear a close analogy to those of man.

The analysis of tubercle has thrown no light on its origin. Hecht of Strasburgh, found it composed of nearly equal parts of albumen, fibrin and gelatin. Thenard, on the other hand, obtained ninety-eight parts of albumen, out of a hundred. These differences may have arisen from the different stages or ages of the tubercular deposits, examined.

The most common form under which tubercular matter is deposited, is the miliary, or that which resembles millet seeds. These small bodies vary in density, from that of a semi-solid, to fibro-cartilage: and although generally of a dull yellowish colour, are sometimes gray, and at others of a milky blue.

At first perfectly distinct, the granules at length coalesce, and form large irregular masses. In general, tubercles have no other covering than the surrounding tissues: but now and then, we find them encysted. Examples of this, presented themselves in the lungs of phthisical subjects exhibited to the clinical students of the Louisville Hospital, last winter. The parietes of the cyst, none of which exceeded the size of a hazel nut, were dense, fibrous and closely adherent to the tissue in which they were embedded. Such tubercles bear a

striking resemblance to those in which the peritoneal envelope of the mesenteric gland constitutes the sac.

"This variety of tubercle is very rare. Louis has seen only a solitary instance; and Professor Carswell appears altogether to doubt the possibility of its occurrence. The celebrated Laennec also met with it only on a few occasions; and, thus far, although I have made numerous examinations of persons who have died of this malady, I have never seen more than five or six well marked examples of it. The situations in which it is most commonly found are the peritonæum, the lungs, the brain, the bronchial lymphatic ganglions, and the bones. According to Meckel, the encysted variety of tubercle is more frequent in the inferior animals, as the monkey, dog, and antelope, than in the human subject."

A third variety of tubercle is the infiltrated; a fourth the stratiform. All of these varieties are represented by our author in a lithograph; and his account of each, is as full as an elementary work requires. We must bear in mind, that these distinctions are not founded on a difference in composition of the tubercular matter, or of the mode of morbid action which leads to its deposit, but on the manner of its aggregation. We cannot, therefore, attach so much practical importance to their study as many writers claim for it.

As tubercles, (not softened into a puriform fluid,) are always found more or less indurated, it has, by some pathologists been affirmed, that they are hard at the moment of their secretion. Our author ably, and as we think, successfully combats this opinion, and shows that they harden by the absorption of their thinner parts. The following extract will be read with interest:

"In certain parts of the body, as, for example, in the peritonæum, we can detect nature, as it were, in the very act of her work, and distinctly examine this substance as it is about being converted from the fluid into the solid state. In several cases of chronic inflammation of this membrane, I have dis-

covered tubercles in every possible stage of development, some of them—evidently deposited only a day or two before the individual expired—being of a soft, viscid consistence, and perfectly transparent appearance; others semi-concrete yellowish, and consequently more or less opaque; and, lastly, another set perfectly dense and firm, like fibro-cartilage, organized, and covered by an accidental serous membrane, of the most delicate texture. Thus, the conclusion is obvious, that all tubercular matter, whatever may be its form, site, extent, is, in the first instance, of a liquid nature, and that it becomes solid only by the removal of the serosity which is always poured out simultaneously with it."

Our author has devoted a page to the nature of tubercles. We shall content ourselves with extracting its closing paragraph:

"After much reflection, however, upon the subject, and from careful and repeated examinations of tubercles in different organs of the body, in different individuals, and in different stages of their development and growth, I am constrained to believe that these heterologous formations are originally nothing but a species of coagulating lymph, thrown out as an effect of inflammatory irritation, and modified in its character according to the tissues in which it is deposited."

Having in the beginning of our review, given some reasons for dissenting from the class of pathologists, who like our author, believe in the inflammatory origin of tubercles, we shall offer no comments on his extract.

Professor Gross is an earnest advocate for the organizable constitution of tubercle. This, in fact, is but a corollary from his other proposition, that they are essentially the product of inflammatory action, and contain fibrin, the chief element of the false membranes. Not content with entrenching himself behind the authority of writers, he informs us that

"Within the last two years, I have examined not less than six specimens of organized tubercles, one occurring in the

kidney, two in the spleen, one in the peritonæum, and two in the lungs. They were taken mostly from children under twelve months of age. The tubercles were of the miliary kind, and numerous vessels, loaded with florid blood, could be seen shooting into them in every possible direction, many of them penetrating a considerable distance into their substance."

These observations would undoubtedly settle the question, if it could be shown, that these vessels did not belong to or run along the processes or lamellæ of cellular tissue, enveloped in tubercular matter. We can see no reason why such enveloping should not take place. In his Organic Remains, Parkinson has figured several flocculi, or filamentous textures remaining suspended in the menstruum with which he dissolved the calcareous matter, which composed the mass of certain marine petrifactions. This delicate, lamellated structure, he regarded as the cellular membrane, of the mollusca which after death had become petrified. The stony matter had taken the place of the more perishable parts of the animal, and the cellular tissue had become enveloped and perpetuated. May not the same thing sometimes happen, in the infiltration or deposit of tuberculous matter? It may be said, however, that the cellular membrane is devoid of blood vessels. But is this the fact? Is it not *traversed* by arterial ramifications? Moreover, is it not the seat of rapid and destructive inflammation? Does not arterial exhalation go on perpetually in its areolæ? And are not these facts indicative of a degree of vascularity, sufficient to account for the appearances observed by our author?

We do not, however, regard the question of the organizable property of tubercles, as offering any great practical interest. If they become organized it is but to die and dissolve. Their organization never makes them, like the false membranes, a permanent adjunct of our organs, and we do

not perceive, that in the treatment of tubercular diseases anything whatever turns upon the decision of the question. Our author admits that they do not always undergo organization; but he does not suggest any management specifically appropriate to the two conditions.

All the world knows, that tubercles soften and dissolve; that this in fact is the law of their existence, and that until this change takes place, or at least commences, they offer but little embarrassment to the organs in which they are deposited. On this process our author makes the following observations:

"But, whatever notions may be entertained concerning the origin and nature of these bodies,—whether we consider them with Wepfer, Broussais, and others, merely as diseased lymphatic ganglions, or with myself, as depositions of coagulating lymph, produced by inflammatory action, and susceptible, under certain circumstances and conditions of the system, of organization, they sooner or later become soft and fluid, the necessary consequence, it may be presumed, of their crude state. This process is supposed, by Louis and Laennec, always to begin in the centre of each mass; but Andral and Carswell maintain that it may commence at any part, indifferently, at the centre or at the circumference; and such, precisely, is the result of my own observations. As it progresses, the tubercular matter becomes daily more and more soft, moist, and unctuous, until at length it acquires the ropiness and fluidity of pus. When the degeneration involves the whole mass, it is usual to find two different kinds of matter in it; one thick, straw-colored, and inodorous, like laudable pus; the other thin, commonly tinged with blood, and mixed with small, opaque cheesy flakes. This is more particularly the case in scrofulous subjects, in whom the fluid in question often strongly resembles whey, with minute portions of curd floating in it.

"Conformably with the doctrine which it has been attempted here to enforce,—that tubercles are organized structures,—the process of softening may be supposed to be analogous to slow suppuration, by which the heterologous tissue is gradually broken up and destroyed. Let me be understood. After tubercles have existed for sometime in an organ, as, for ex-

ample, the lungs, they begin to act as extraneous bodies, producing irritation in the immediately circumjacent textures. This irritation, it may be presumed, is speedily propagated to the tubercles themselves; and, as their vital endowments are comparatively feeble, and consequently incapable of much resistance, they soon yield to the invasion, the rapidity of their softening being always in direct proportion to the violence of the exciting cause and the density of the morbid growth. Those, on the other hand, who believe that tubercles are organic, maintain that their softening is brought about by the agency of the surrounding tissues, alleging that they are incapable of undergoing such a change by any powers of their own. If this explanation were correct, the process should always begin at the periphery of these bodies, which however, as was before stated, is not the case.

"The softening takes place much more rapidly in some organs than in others, in which it does either not occur at all, or only after a long period. In the lungs, where the process has hitherto been chiefly studied, it may take place as early as the end of the first month from the time of the deposition, though generally not until much later. Upon this subject, however, it is obviously impossible to lay down any definite rule, as the production of the phenomenon in question must necessarily be influenced by a great variety of causes, such as the extent of the disease, the state of the patient's health, the density of the heterologous deposit, together with numerous other circumstances which will readily suggest themselves to the mind of the reader. Occasionally the softening goes on simultaneously over a large extent of surface, so as to break down one-third, a half, or two-thirds of an organ; but this occurrence is extremely rare, and is confined exclusively to acute cases. In the lungs, the degeneration usually begins at the summit of these organs, and gradually extends towards the base, as is shown by the fact, that if these viscera be examined in this direction, we successively find, at various heights, excavations and tubercles in different stages of softening,—the more solid being almost always lowest in the scale. Before the changes, of which we have now spoken, take place, the morbid deposit appears to create little disturbance in the general economy, and may exist, sometimes to a very considerable extent, without giving rise to symptoms indicative of its presence."

With this extended extract we shall for the present number close our analytical notices. The section on tubercles

running through nearly twenty pages, is replete with valuable information, and although we have questioned the soundness of some of its *speculations*, we feel it our duty in the strongest terms, to commend it to all our readers.

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We observe that the Journals of the United States, generally, have expressed a favourable opinion of Prof. Gross's work. But the American Journal, for August, presents its readers with an extended review, the drift of which, from beginning to end, is disparagement. The means of this disparagement are the selection and array of minute imperfections, and the omission of almost every notice which might be given of rich and ample excellencies. The readers of that review, were they to rely upon its statements, could not fail to regard the work as unworthy of a perusal. The Reviewer admits that its plan is good, but insinuates that its author is behind the times, and writes like one who had made up his work in the dissecting room, in the midst of subjects, with whose history he was unacquainted. Now we affirm as a fact, that the authorities cited by Prof. Gross far outnumber those of Andral; and that they are with adequate fulness brought down to the early part of the year 1839, when the manuscript was completed. We do not, of course, intimate that *all* the facts in pathological anatomy are given, for these would fill a library; but we say, that the object of the author—the production of an *elementary* treatise, on general and special pathological anatomy—has been most ably executed. The assertion, that he has not written like a practical man, is entirely gratuitous. We do not claim for our author the opportunities of personal observation, enjoyed by

Baillie, Andral or Louis, but we refer to the work itself, for evidences of a wide and diversified experience; not a little of which has been in hospitals, but much more in private practice, in a city of 40,000 inhabitants, in which, as we believe, *post mortem* examinations are oftener permitted—indeed proposed by the friends—than in any other city of the same population in the Union. In that place Prof. G. has not only had an extensive practice; but, as we have already stated, has for several years made inspections of the kind to which we are now referring, for nearly all his brethren.

The American Journal professes to be a National Review, and often breathes a patronizing spirit. It regards itself as the official of our ancient *Alma Mater*—the organ of the American profession—*the* Messenger of the New World to the Old! We certainly have no disposition to question these high pretensions—we even feel proud of its fame, and wish it long life and wide dominion. But the sun himself has spots, and the humble inhabitants of our earth can discover and note them as blemishes. They cannot tell what occasions the dark places; nor can we exactly divine the motive which has prompted the great censor of our medical literature, to aim at the destruction, in the first year of its existence, of the first extended and systematic work on a new and difficult branch of the profession, which our country has brought forth. Nevertheless as every effect has its cause, so every act of deliberate injustice has its object, and that which, on this occasion, justice requires us to condemn, will no doubt be revealed in due time. D.

(*To be continued.*)

Selections from American and Foreign Journals.

Fatal effects from acetate of lead given in large amount for Phthisis Pulmonalis. By Dr. Bicking, of Mulhouse.

Although we possess a large number of observations in which the acetate of lead has been given with success, or, at least, without serious accident, for phthisis pulmonalis, there are others in which troublesome results have followed from the prolonged use of this medicine, and, on this point, Dr. Bicking cites the following case:

Ferdinand R——, aged fifteen years, subject, during his younger days, to attacks of scrofula, suffered several times from affections of the chest, and finally became consumptive. Having arrived at an advanced stage of this affection of the lungs, accompanied with hectic fever, sweats, and colliquative diarrhœa, without any remedy having power to arrest or alleviate its course, Dr. Bicking commenced with the use of acetate of lead.

I gave, says he, to the patient, a quarter of a grain of acetate of lead reduced to powder, along with sugar of milk, four times a day, during a certain time. Under its influence I obtained a marked amendment in the course of the morbid symptoms; the fever, the sweats, the dejections, and cough diminished. The purulent expectoration likewise diminished without any increase of oppression; this advantageous result induced me to continue the treatment, and, during six weeks, I successively increased the dose of the medicine, so that at the end of this time the patient took two grains of the acetate of lead during the day.

At this period, the patient experienced a marked relief, troubled from time to time with some returns of the same general symptoms from which he had been relieved, and, at each

return, I employed, with success, the same means. In twelve weeks every trace of phthisis had disappeared, and the child who returned to school, was no longer subject to medical treatment. He had taken, in the course of the disease, nearly an hundred and thirty grains of acetate of lead, without any poisonous or even hurtful effect.

In the meantime, he could not regain entirely, his health; his strength declined, he became thin and pale, and his pulse frequent; frequent difficulty of respiration, pains in the chest, and an obstinate cough of irritation. I was apprehensive of an immediate renewal of the consumptive attacks. My fears were realized, but in another manner.

One month after the appetite gradually failed, the hypochondrium became affected with painful spasms; the stools were rare and painful; the skin over the whole body became blueish; the conntenance became puffed up and hot, the hair fell out; soon a convulsive cough supervened, accompanied by great difficulty of respiration, and burning pains in the chest, to which succeeded partial paralysis of the feet. This state remained fourteen days. One evening he experienced a violent access of fever, with heaviness of the head, paralysis of the eyelids, and convulsions in the face and extremities.

All remedies were unavailable; the patient remained insensible, in stupor or delirium; he died the third day after, but no autopsy was made.—C. W. *Hufeland's Journ. des Practs. Heilk.* 1839.

The publication of this notice should not, however, lead to the belief that the medicinal use of acetate of lead is always followed by fatal effects. We believe that it is necessary to study the therapeutic action of this acetate; we know that large quantities of this salt have been taken, in several cases, and we have seen Dr. Bricheteau treat, with pills of acetate of lead, Mademoiselle C—— S——, who was considered to be affected with consumption. This treatment was followed by great success, and the lady is now married, and has several children, and enjoys a good state of health. A. C.
Journ. de Chim. Med.

The above case is one of those rare occurrences in which a remedy, in many cases of great advantage, has been followed by lamentable consequences from its prolonged use. It may be advantageous to enquire to what cause such effects may be owing. In addition to the observations in the note of M. A Chevallier, it may be asked, may not this effect arise from the

formation of a carbonate of lead in the stomach of a patient whose digestive organs are much debilitated? Although pure neutral acetate of lead is not affected by free carbonic acid, nevertheless the acetate of the shops is always more or less affected by the presence of this gas, solutions always being cloudy when not made with distilled water. This is due to the loss of a portion of acetic acid, consequent on the exposure of the crystals to the air. This exposure is followed by an opacity of the external crystals by efflorescence, but that, in this instance, the result is not entirely owing to the loss of water of crystallization may be concluded from the strong smell of acetic acid which is exhaled by a jar of acetate of lead when recently unstopped. In this country, the acetate is commonly used in much larger doses than is here stated: a very common prescription, especially in dysentery, cholera morbus, &c., being two or three grains of acetate frequently repeated, and it is rare indeed to hear of any injurious effects therefrom. The custom, however here, is to unite, in the same prescription, a greater or lesser quantity of opium, as a means of obviating any injurious effects of the remedy, as well as to fulfil other indications in the above diseases. That it may have this tendency, will be obvious in considering the reactions which will be consequent on the mixture of these two ingredients. The meconic acid of the bimeconate of morphia would first neutralize any excess of oxide of lead in the acetate, and then the remainder would unite with more of the lead, and liberate acetic acid, thus forming an insoluble meconate of lead, which would pass through the intestines and be discharged. This remedy, however, is not employed to the same extent here in chronic cases, where a long continued use is required to produce its full effect, as it is in Germany. In this latter country it is very highly recommended in consumptive affections, and effects may result from its prolonged use, which would not appear from a greater amount of the remedy given in a much shorter time. R. B. *American Journal of Pharmacy.*

On the transformation of Calomel into Corrosive Sublimate. By M. MIALHE.

I HAVE the honor to communicate to the Society of Pharmacy, the summary of some experiments which I have made on the transformation of calomel into corrosive sublimate, experiments which I was suddenly forced to interrupt.

The point from which I started with my researches, was the following fact, reported by Vogel. A physician prescribed for a child twelve papers, each containing five grains of sal ammoniac, five grains of sugar, and half a grain of calomel: the child having died after taking several of the powders, the apothecary was accused of having committed an error in compounding the prescription. Luckily for our colleague, the accusation which hung over him was of short duration, Peter Koffer having quickly proven that, in presence of sal ammoniac and of water, calomel is partially changed into corrosive sublimate. This fact, of which I have ascertained the exactness, has always appeared to me very remarkable, and well worthy of fixing the attention of physicians and physiologists. It would not be so, if the assertion of one of the most distinguished professors of our school were founded in fact. This professor asserts to have proven, by means of experiment, that the chemical change of protochloride of mercury into deutochloride, does not take place under the circumstances stated by the German chemist. I shall not attempt to point out whence is the source of error into which our learned colleague has fallen; I shall at present content myself with publishing the conclusions which result from my experiments.

1. The protochloride of mercury, in presence of hydrochlorate of ammonia, or of the chlorides of sodium or potassium, and of pure distilled water, is changed partly into deutochloride of mercury, and into metallic mercury. This change takes place at the temperature of the human body, and even at common temperatures, and demands but few moments of contact to be effective. It is sufficient, for example, to be convinced of this fact, to allow calomel to remain a few minutes in the mouth; a mercurial taste, of sufficient intensity, will not be slow in exhibiting itself. This taste is the result of the mutual reaction of the chloride of mercury, and the alkaline chlorides in the saliva.

2. It is to the change of calomel into corrosive sublimate, and metallic mercury under the influence of sea-salt and the salts of ammonia, which we know to exist in the liquids of the alimentary canal, that we must attribute the pathological phenomena of mercurial salivation, from the administration of calomel. What proves that this is really the case, is, that when the protochloride of mercury does not purge, but is retained for a long time in the digestive tube, it excites an unusual secretion from the salivary glands, and this on account of the large quantity of corrosive sublimate which is produced.

The same phenomena happens after the long continued use of the protochloride of mercury, and from the same cause.

3. As the quantity of corrosive sublimate formed can only be proportional to the amount of alkaline chlorides which are contained in the viscera, those persons who eat large quantities of common salt, every thing else being equal, should be more susceptible than others, when under a mercurial course of medicine.

4. The antisyphilitic properties are communicated to it, either in whole or in part, by the sublimate and the mercury to which its chemical decomposition gives rise. It is, without doubt, the same as regards its anthelmintic virtues; it is by producing poisonous effects on the ascarides, by means of the two agents mentioned, that the mercurial chloride relieves us from these importunate guests.

5. All that has been said of the medicinal action of calomel may likewise be predicated of the prot-iodide of mercury, which, under the same circumstances, is converted into deut-iodide.—*Journ. de Pharm.—American Journal of Pharmacy.*

Emetics of Ipecacuan. in Hemorrhage.—Dr. Osborne states that this treatment in menorrhagia has never as yet failed in his hands, except when the progress of the case afterwards proved the formation of scirrhous or cancerous structures of the uterus. "The remarkable effects of emetics of ipecacuanha in restraining hemorrhage," he adds, "is not confined to this organ. In a case of violent epistaxis, in which several remedies were ineffectual, I tried it while preparations were going on for plugging the posterior nares, and with success, so as to render that measure unnecessary. In hemoptysis, I am unable to add the facts already known respecting its efficacy, being of opinion that hemorrhage from the lungs is always salutary, and that the practice of giving the mineral acids, &c., to discourage it in phthisis is injurious. A very considerable benefit is generally perceptible, after the vessels of the diseased lung have been unloaded by this discharge. When, however, a violent hemorrhage takes place from the lungs, and blood is expectorated in such quantities as to endanger life, then all our efforts must be directed to its suppression. In a late case (not phthisis) I failed in the emetic, but as I lost sight of the patient subsequently, I am unable to pronounce as to the cause of the hemorrhage, and therefore as to the cause of the failure."—*Dublin Journal of Medical Sciences.—Boston Med. and Surg. Jour.*

Cure of Strabismus.—M. Jules Guerin announces, in a letter recently addressed to the Academy of Sciences, that he has performed Dieffenbach's operation for the cure of strabismus in four cases with success.

I had long ago established, says M. Guerin, and publicly professed, that strabismus depends on retraction of the muscles of the eye, and its various forms depend on the different degrees of retraction, variously affecting the different muscles which move the eyeball. This is a simple application of my theory of the deformities of the joints in general, which elicited from a distinguished member of the Academy, the quaint, but just remark, that squinting was the club-foot of the eye. In accordance with this theory, I have proposed to extend to the eye the section of its muscles; the mode of operating which I have adopted, differs slightly from that of Dieffenbach; the results have been advantageous, but not immediately so: in one case only did the eye become quite straight soon after the operation; in others there was merely an amelioration, and this circumstance appears to me to be a natural consequence of the true origin of squinting.—*Journal des Debats. Ibid.*

Red Sulphur Springs.—I passed on without stopping long at any of the springs until I reached the Red Sulphur, which is the most distant of them. It is situated in the county of Munroe, seventeen miles from the Salt Sulphur, and of course forty-two miles from the White. The spring is concealed in a glen in the midst of hills, which surround it completely, forming, however, a narrow valley, the length of which is much greater than the breadth. These hills were at one time covered with high trees; but the proprietor of the spring, Mr. Burke, has cleared them away, from a well-grounded apprehension on the part of the invalids that they obstructed the circulation of the air, and rendered the place damp. The hills shelter the buildings and the whole inclosure from the cutting winds which are often felt in the springs near the Allegheny mountains; the climate therefore is extremely mild in the summer season, and subject only to one inconvenience—the damp fogs and occasional chillness in the evening; this is, however, readily guarded against by a little fire in the cabins. Most of the invalids avoid walking after sunset, or in the early part of the morning until the dew is cleared away.

The summer climate is therefore not unexceptionable; but is still vastly better for a pulmonary invalid than the excessive heat of the eastern plains, or the cold breezes of the seaside. In pulmonary cases, properly speaking, I have observed no inconvenience; but I have met with asthmatics who were injured quite seriously by a journey to the mountains, which was incautiously advised by their medical attendant. The sharp air and the alternations of temperature produce much greater effects upon them than on those who are disposed to tuberculous diseases.

The reputation of the Red Sulphur Springs is chiefly founded upon its efficacy in either alleviating or curing pulmonary diseases, including catarrhs of long standing, and commencing tuberculous cases. Even in patients who have long labored under the latter form of disease, the benefits of the spring have been much sought for. A reputation of this kind, which arose gradually, and was sustained for many years, notwithstanding many disadvantages of situation, and an almost absolute dearth of comfortable accommodations for the sick, which then existed, cannot be unfounded. It is true that an exaggerated estimate of the powers of the water, and a carelessness in the selection of patients who have been from time to time sent to the spring, have produced an impression which is unfavorable to its true value.

I met with a remarkable instance of this. On my return from the Red Sulphur, at the Salt Sulphur I found a young married lady who had just arrived from a long journey of sixteen days; during this whole period she had labored under a colliquative diarrhœa, and an exhausting hectic, with the thick yellow expectoration which indicates the rapid softening of tuberculous matter. I was then called to see her in consultation with a gentleman from the same part of the country in which she resided, and found her rapidly sinking; at our earnest request, the friends of the lady, who were utterly unconscious of her danger, consented to give up their intention of proceeding farther; she died the next day, and but for our interference, would have sunk in the course of the last day's journey. These extreme cases are not frequent, but there are many instances in which much mischief arises from advising patients in the last stage of pulmonary phthisis to resort to the Red Sulphur, precisely as in similar circumstances it is pernicious and morally wrong to direct them to abandon the comforts of home in the vain hope of seeking for health in a warmer climate. No patients who are exhausted by hectic fever, and copious purulent expecto-

ration proceeding from cavities, should be sent to a distant place; and a long journey should be still more sedulously avoided if there is much diarrhœa. The latter symptom is generally aggravated by the journey, and the patient is besides unable to take the Red Sulphur water in sufficient quantities to produce any sensible effects; for the quantity, rathan the quality of the water, tends to increase the discharge from the bowels. It is under certain circumstances desirable for invalids in the last stages of pulmonary disease to leave their accustomed air, and seek for a restoration of strength, if not an entire recovery; but these persons should seek a nearer retreat, and one exempt from the fatigues of a mountain journey.

The explanations which are given of the mode in which the water of the Red Sulphur Spring acts in relieving phthisis, do not seem to me to be well founded. It is thought that it has a direct power of diminishing the frequency of the pulse. It is true that this result does follow in a certain proportion of cases; but on a careful examination of many patients who took the water, I found that this effect did not occur at the beginning of many of the cases. It is true that when the irritation of the disease was to a certain extent subdued, the pulse became less frequent; but this did not appear to result from any peculiar action of the water. Its first action was that of a sedative, perhaps more nearly resembling minute doses of hydrocyanic acid than any thing else. It caused a tendency to sleep in nearly every patient, and in some gave rise to considerable headache, and a disagreeable sensation of fulness, which lasted for a few days. The water passed off by the kidneys, producing little effect on the bowels or the skin. It may, however, be readily determined to the surface by proper attention to warmth.

The quantity of water taken is very various; in former times it was much more freely drank than at present; invalids now rarely take more than eight tumblers, about three pints, in a day. But if the water does not produce a permanently disagreeable effect upon the alimentary canal, it may be properly taken in much larger doses, say from ten to twenty glasses of the kind usually employed at the spring. But while taking the water the invalid should take constant and regular exercise; this precaution is one always to be observed when using mineral waters, but certainly by no class of patients more faithfully than those disposed to phthisis. Yet simple and obvious as is this rule of hygiene, the patients have of late been singularly negligent in this matter, and

often limit their exercises to an occasional game at ninepins, and a quiet stroll about the grounds. The water should be taken in divided quantities before each meal, but especially before breakfast. Thus, if the allowance be eight glasses, three of them should be taken before breakfast, in the space of an hour or two; two before dinner, allowing the same period for it; one before supper, and two in the evening. But between every glass, as much exercise as practicable without producing fatigue, should be taken if the weather be fine. If the morning should be cool, it is proper either to exercise within doors, or in the piazzas, which, at the Red Sulphur, extend several hundred feet in length.

Much of the benefit of mineral water depends upon the facility with which it is absorbed, and, as it were diffused throughout the system: this diffusion is greatly promoted by vigorous exercise, which prevents the unpleasant sensation of a load or fulness at the stomach, that often occurs under different circumstances, Exercise is more necessary while taking a water like that of Red Sulphur, which contains but a very small proportion of saline matter, and depends for its action chiefly upon its gaseous elements, which are less readily determined towards a particular organ.

The red deposit which gives name to the spring is less copious this year than usual; in fact, it is scarcely a deposit; a portion of sulphur is combined with a peculiar organic substance, apparently some variety of the cryptogamous plants. The spring has been carefully cleared out, and the sides for the deposition of the plant may have been removed. Some of the old visiters to the spring fancy that the strength of its waters has been impaired by the copious rains of the summer, but this opinion does not obtain amongst others.

The action of the water is certainly that of a mild alterative, as well as sedative, and it is useful not merely in cases of commencing phthisis, but of many sub-acute inflammations of the mucous membranes. Indeed, in pulmonary disease the water is apparently most beneficial in the stages of the diseases in which there is a slight irritation, sufficient to cause some feverishness, but not to give rise to very acute symptoms. The acute forms of phthisis are usually aggravated by a residence at the Red Sulphur; at least this was my experience during the present summer; but this aggravation manifestly depends more on the irritation of the journey and peculiarities of climate, than on any action of the water. The therapeutic rule, that much exercise, or excitement of any kind, is injurious in acute phthisis, always holds good.

The disorders of the mucous membranes in which this water is the most useful, are chronic inflammations of the stomach and bowels, especially the varieties which are sub-acute from the beginning: when the case is one of chronic dysentery following the acute form of the disease, the good effects of the water seem to me more problematical; but of this I have no personal experience. In chronic irritation of the urinary passages a like good effect has often been noticed; I recommended it in cases of this kind, but was not able from my own experience to confirm the results which have been previously observed. In these diseases the water acts medicinally by its alterative virtues; in the functional diseases of the heart the action of the water is more complex, and is partly derived from its alterative, and partly from its sedative qualities. An interesting case of this kind occurred to me: a young gentleman, a student of the University of Virginia, was affected with a disease of the heart, chiefly symptomatic, and dependent upon nervous derangement and dyspepsia, but in part connected with a real enlargement of this organ. After remaining some time at the White Sulphur without benefit, he resorted to the Red Sulphur,—and after taking the waters for a few days with the usual precautions, his symptoms rapidly declined. A single case of this kind is of no value, but the general experience is decidly favorable to the effects of the water in this form of disease.

A mild mineral water like the Red Sulphur, which contains, it is believed, but little more active ingredients than sulphuretted hydrogen and nitrogen gas, must derive much of its virtue from the temperature and quantity of the water. The medicinal ingredients act probably quite as effectually by the direction which they give to the water, as by the remedial properties peculiar to themselves.—*Medical Examiner, Aug. 15th*, 1840.

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LANCASTER MEDICAL INSTITUTE.

We regard every association for professional improvement, as entitled to commendation. Under this feeling, we have already noticed two or three in the sister States of Kentucky and Ohio; and propose to make known to our readers, all with which we may happen to become acquainted. On a late visit to Lancaster, in the latter State, we had the pleasure of learning something of a society, composed of its respectable physicians, which is manifestly exerting a beneficial influence on the character of the profession in that place. We have prefixed its title to this article. Its President, is Dr. James White, Vice President, Dr. G. W. Boerstler, Secretary, Dr. M. Z. Kreider, and Treasurer, Dr. H. H. Waite.

The primary object of this Institute, is "the advancement of medical science *among its members.*" To this end, it holds semi-monthly meetings in November, December, January, February and March, and monthly meetings, during the remainder of the year. At each meeting, a topic is selected for discussion at the next. It is expected that all interesting clinical cases will be reported to

the Institute, and the members are furthermore invited to read essays, on the subjects they may investigate, either in medicine or the auxiliary sciences. At the end of his annual term of service it is the duty of the President to deliver a scientific discourse. All these productions are subjected to discussion. It is a further object to regulate the intercourse, and promote the harmony of its members: also to subscribe for Medical Journals.

Now, if the physicians of every country town in the Valley of the Mississippi, were thus to unite, it would unquestionably give an immediate impulse to the profession. They would all be made abler, happier, and more respectable. And why should they not thus unite? Why not resolve to apply their shoulders to the wheels of their profession, and in a spirit of noble emulation, give it a long push, a strong push and a push all together? This would certainly be preferable to the push-pin employments, in which so many of us push away the hours not devoted to the sick; and although, at first the new custom might make us feel a little awkward, it would soon grow into a habit, of which no one would be ashamed. D.

DOVER'S POWDER MODIFIED.

Dr. Townsend, of Wheeling, has sent to Dr. Drake a note, in which he recommends two new ingredients in the formula for this popular compound—nitrate of potash and the powdered root of the sanguinaria Canadensis. Many of our brethren in the West, have long been accustomed to substitute the former of these articles for the sulphate of potash, but have not dispensed with the Ipecacuanha. Here is the Doctor's recipe: Opium and the powdered root of the sanguinaria, each one grain, nitrate of potash eight grains, mixed intimately by trituration. This preparation he has used, instead of the officinal, since the year 1816. The following are his pharmaceutic and practical remarks concerning it:

"It is said in our Dispensatories that the only use of the sulphate of potash is, to reduce the opium to an impalpable powder by the hardness of its crystals. I dry the opium and then pulverize it until it all passes through a fine seive. This enables me to use the nitrate of potash, which is a diuretic salt of long established value, and always admissible when the Dover's powder is proper.

Instead of the ipecacuanha of the old preparation, I have substituted the pulverized root of the ***sanguinaria canadensis***, which is as good a diaphoretic as the the ipecac., at the same time that it is an alterative of nearly as high powers as mercury. My Dover's powder, then, does not contain any thing in the old preparation but the opium.

"I am aware that many are opposed to every thing new. But let such look at the long list of diseases enumerated by Professor Tully, in which sanguinaria has been found highly beneficial as a deobstruent or alterative; and they may be enabled to appreciate its value as a substitute for ipecacuanha in the composition of Dover's powder; and instead of a useless innovation, they may find it to be a real improvement. There is now no question that, as a diaphoretic, for which Dover's powder is so frequently employed, the sanguinaria will do all that ipecacuanha is capable of doing. If, then, sanguinaria possesses other and valuable properties, not possessed by the ipecacuanha but calculated to fill the indications for which Dover's powder is usually prescribed, it must be obvious that it will render the new preparation a better article, and consequently deserving of the attention of the medical profession.

"I might, from the facts already known of the *modus operandi* of the sanguinaria, go on to show, theoretically, that this modification of the Dover's powder is calculated to make it a very superior article to the old preparation. But I am contented with using it in my own practice, and with giving this simple notice, that those of the profession who think proper may avail themselves of any advantage this preparation can afford. The sanguinaria is the growth and product of our own country. This alone is by no means an unimportant consideration, inasmuch as it will assist, as far as it goes, in rendering us independent of other and foreign countries for a necessary article." D.

TEMPORARY HEMIPLEGIA AND APHONIA, APPARENTLY FROM WORMS.

Dr. A. A. Patterson, of Franklin county Kentucky, in a letter to Dr. Drake, communicates the following case:

"September 6th, 1838, I was sent for in haste, by Mr. D. to visit his son, ten years old, whom I found totally paralytic in the right

side and unable to speak. Desiring to see his tongue, he was unable to protrude it, and I had actually to bring it forward with my fingers—it was coated with a white fur to its edges, which were preternaturally red. His pulse beat 115 strokes in a minute. The expression of his countenance was rather idiotic. During the day, before my arrival, he had vomited four or five lumbricoides.

"I immediately ordered an emetic, which caused the discharge of several additional worms, with some bile. I then administered a dose of calomel and jalap, eight grains each; and left two additional portions of the former medicine, each nine grains, to be exhibited at intervals of two hours.

"When I called the next day, my patient was able to walk about and speak. I prescribed a dose of castor oil; and when I saw him a few days afterwards, he was quite well." D.

PROGRESS OF THE TEMPERANCE REFORM.

Within the last six months, we have had ample opportunities of observing the present state of the temperance reform in the Valley of the Ohio—emphatically the heart of the West. Everywhere the friends of temperance appear to be languid, and, in most places, absolutely inert. This does not strike us as remarkable; for nothing is more difficult than to sustain an associated benevolent effort for a great length of time. All such efforts are essentially intermittent. We look for a revival at no distant day. Some new influence will arise, and reproduce the noble warfare of the past.—Meanwhile, we are enabled to say, that in almost every part of the West, that warfare, has been most effective. A careful inquiry of physicians, and intelligent observers of all classes, has convinced us, that the amount of drinking is far less than it was twelve years ago, when the first combinations against it were organized among us. Few or no families now take their morning bitters and, yet, the ague and fever is rather on the decrease than the increase; the practice of offering intoxicating drinks to visiters, has signally declined; the amount drunk at the tables of our taverns and steamboats, has diminished in an equal degree; labouring men take far less than they formerly did—a great number of farmers even give none in harvest time, and still find their operatives much more effi-

cient and enduring, than under the old regimen; at our Fourth of July celebrations, but little is drunk compared with what our fathers consumed on that national festival; the great political meetings of both parties have been characterized by temperance in drinking, whatever may have been the intemperance of their partisan feelings; finally a "drunken doctor" is becoming a phenomenon, which the boys are beginning to chase in the street!

Such are the fruits of a few years exertion, and we conscientiously believe them as rich and abundant as the most sanguine friends of reform ever anticipated. We must not forget, however, that the disease remains uneradicated. The inflammation has been subdued into a subacute and chronic form; but such a morbid action may do the work of destruction, and is at all times liable to be awakened into activity. We call upon our brethren, especially, to be vigilant and tireless in this labour of love and duty. Of all the professions, theirs is the one which may exert the greatest corrective power, and *therefore* lies under the heaviest responsibility. D.

LOUISVILLE MARINE HOSPITAL.

It is pretty universally conceded, we believe, that Clinical practice cannot be rendered of much avail to a large medical class, where the patients are examined and prescribed for in the ordinary wards of a hospital. But few, comparatively, of such a class, can see either the patient or the medical attendant, and all interest is soon lost in the case where the ear alone is addressed and the symptoms cannot be noted. Impressed with this disadvantage, and regarding the Hospital as the right arm of the Medical Institute, the Faculty determined, last winter, on erecting a Lecture and Operating Room in connexion with the main building. This room is now in progress and will be in readiness for the class by the last of October. It is placed a few feet south of the old building, of which it will form a wing, being connected with it by a gallery, along which the patients, either for medical or surgical treatment, will be carried on their beds from the wards without exposure or inconvenience. The room will the be capable of seating four hundred persons, and being arranged in form of an amphitheatre, with sky-lights, will afford to each student a full view of the patient while undergoing examinations or opera-

tions. In this arrangement, the well-founded objection against the usefulness of hospitals to large classes of medical students, that they can neither see the sick, nor distinctly hear the prescriptions for them, will be wholly obviated. The Institute will be fully in possession of this most important element of medical instruction.—A sufficient number of patients is always found in the medical and surgical wards to give interest and value to clinical lectures. Y.

TEA AND COFFEE, AS THE CAUSE OF SICK-HEADACHE.

Dr. Brooks, of Harrisonville, Mo., demolishes the theory of Dr. Burbell, noticed in our July No., that the use of tea and coffee is the source of the accumulating anguish which flows from this disease. He proceeds on this wise:

"I was brought up in Kentucky in early times when it was not easy to procure tea and coffee, and when, consequently, they were little used. Those who lived most luxuriously drank coffee once a week, but then it was not made strong, as now, but was frequently mixed with parched rye or wheat. In those days, I had around me a connexion of about a thousand souls, all of whom, except one, were more or less addicted to this complaint. Since that time, my family connexion has much increased, and from all I can learn sick-headache has diminished amongst them, notwithstanding that, like most other people, they have fallen into the habit of drinking tea and coffee, many of them to excess. I do not wish to be understood as expressing a belief, that these beverages are remedies for the disease, but only that they are not the most common cause of it, and that total abstinence from them will not relieve every case. I have had a fair opportunity of knowing something about this matter—I am upwards of fifty-two years of age, and have been engaged in the practice of medicine for nearly thirty years.

"I wish to make an enquiry about a change which sometimes takes place in children after birth, commonly called *double lip.* I have seen no mention of it in any medical work, nor have I ever heard a medical man speak of the infirmity. Within the last three and twenty years I have met with it in thirty-one children, who were born without it, which I believe is always the case. The deformity commences generally a little to one side of the lip, and gradually

the inside protrudes downwards. I believe it is confined to the upper lip. What is the cause of this affection? Can it be prevented, or cured when it has become confirmed." Y.

VELPEAU'S OPERATIVE SURGERY.

A translation of this work is now in progress by John R. W. Dunbar, M. D., Professor of Surgery in the Washington Medical College, Baltimore, and will be published in the course of next spring. Velpeau's Surgery is one of the ablest works on that subject extant in any language. It will be accompanied by notes on American Surgery by the Translator, and executed with the ability of which the character of Professor Dunbar gives promise, will no doubt prove highly acceptable to the American profession. It should be mentioned, that this is the second edition of Velpeau's Surgery, much enlarged and improved. Y.

HEALTH OF LOUISVILLE.

From the unusual quantity of rain which fell in this city in the last Spring, and first Summer months, it was apprehended that the Fall would be sickly. Up to this time, we are happy to say, these apprehensions have not been realized. The cases of Fever have not been numerous, and, generally, those which have presented have been of an uncommonly mild and manageable character. Upon the whole, it is the opinion of the oldest physicians of the city that few more healthy seasons have passed over Louisville. Y.

DEATH OF DR. PERRINE.

The readers of this Journal, and of its predecessor in Cincinnati, the Western Journal of the Medical and Physical Sciences, will regret to hear that Dr. Henry Perrine, whose interesting communications have often met their eye, is no more. He was killed by the Indians during the night of the 6th of August last, at Indian Key, South Florida, where his last communication to the Journal was dated.

Dr. P. was a native of New Jersey, and received his professional education, we believe, in one of the New York schools. The commencement of his professional career was in the state of Indiana, whence he removed to Mississippi. In both states he distinguished himself by the successful energy of his practice in the malignant intermittents, which from fifteen to twenty years ago prevailed in the West and South. Accounts of his treatment of such cases, by scruple and even drachm doses of Sulphate of Quinine, were published soon afterwards in the American and the Western Journals. While residing in the state of Mississippi, he received the appointment of Consul to the Mexican city of Campeachy, in the province and peninsula of Yucatan, where, during a residence of several years, he made the natural productions and diseases of that region a subject of special study. When the epidemic Cholera reached it, his superior skill and benevolence rendered him a public benefactor. His account of the disease was published soon afterwards in the Western Journal.

During his residence abroad, his active and patriotic mind conceived the design of transplanting into the southern part of Florida a great number of tropical plants, useful in medicine, dietetics, and the arts. To accomplish this, he returned to the United States, and presented to Congress a memorial, praying for the grant of two townships of land in South or Tropical Florida, on which to make the experiment. A report in favor of his application was made, but not acted upon at that session. With indomitable energy, he pressed into his service a great number of his brethren and other scientific men, in different parts of the Union, and at the next or a subsequent session, new and elaborate reports in favor of the object having been made to both Houses of Congress, he obtained the grant of one township.

Although his constitution had been greatly injured by a residence in hot climates, he repaired forthwith to the scene of his future operations, and entered upon them, with his characteristic zeal. He had fixed his residence with a few families at Indian Key, which in the darkness of the night was attacked by 100 or 150 Indians. He went to the cupola of his house and spoke to them in the Spanish language, when he was shot, or at least did not return. His wife and three children effected their escape. His house was burned up, and all his valuable notes and papers, on the production and diseases

of the South consumed along with his body. The following tribute to his character, we extract from a letter of the Hon. James Whitcomb, Commissioner of the General Land Office, at Washington, dated August 24th:

"I enclose you this morning's Intelligencer, by which you will see, that our mutual friend, Dr. H. Perrine has fallen a victim to the savages of Florida. Besides the irreparable loss to his family and his friends, I am apprehensive that his untimely death will defeat the enterprize to which he had, at a considerable expense and a great loss of time devoted himself for the cultivation of tropical plants in that territory. Congress had at the session before the last, as I presume you are apprized, granted to them a tract of land for that purpose, and orders were issued, at his request, not long since, from the General Land Office for the survey of the grant.

"Philanthropy with him was a moving and active principle, nay it was carried to the verge of enthusiasm. He looked, I doubt not upon the Seminoles, as misguided, but well-meaning, and that he could successfully appeal to their humanity. Hence his attempt at a parley and his melancholy fate."

In several letters received at different times, Dr. Perrine has sought to impress on us his own conviction, that Tropical Florida is actually one of the healthiest spots on the continent, and peculiarly fitted by its climate, for the winter residence of the consumptive.

D.

TENOTOMY—A CORRECTION.

To insure a correct and well executed wood cut to accompany the Essay on Tenotomy, the publishers of this Journal sent the original drawings from nature, furnished by the author, to a Cincinnati artist—we are sorry that we are unable to publish his name. Besides the coarseness of the cut, which must strike every eye, its want of accuracy is such as to demand a brief explanation, in order that an erroneous impression of the success of Dr. Richardson's operation be not conveyed. The *ensemble* of the extremities, before as well as after treatment, is much more heavy and clumsy than the drawings indicated; in addition to which, the measurements around the heel and instep of the deformed member are nearly one-

third too great as they are represented in the plate. The same want of observance of the drawings exists in the representation of the restored member, in which the instep is so much elevated as to resemble a shoemaker's last, and the foot appears too much extended, whilst the leg, which in the original drawing was *completely* extended on the thigh, appears in the wood cut partially flexed. Y.